Government
Publications

SESSIONAL PAPERS.

VOL. XXIII.—PART VI.

FIRST SESSION OF SEVENTH LEGISLATURE

OF THE

PROVINCE OF ONTARIO.

SESSION 1891.

Toronto:

PRINTED FOR LUD. K. CAMERON, QUEEN'S PRINTER,
BY WARWICK & SONS, 68 AND 70 FRONT ST. WEST,
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No. 2.. Detailed Report of the Inspector of Insurance for the year ending 31st Decem- 1889. Presented to the Legislature March 10th, 1891. (*Printed.*)

No. 3.. Report of the Registrar-General, relating to the Registration of Births, Marriages and Deaths for the year 1889. Presented to the Legislature 22nd April, 1891. (*Printed.*)

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No. 4.. Report of the Minister of Education for the year 1890, with the Statistics of 1889, in which is included the Reports upon the Scientific Societies, Toronto University, School of Practical Science and Upper Canada College. Presented to the Legislature 13th March, 1891. (*Printed.*)

No. 5.. Report of the Council of the Agriculture and Arts Association for the year 1890. Presented to the Legislature 10th April, 1891. (*Printed.*)

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No. 6.. Report upon the Lunatic and Idiotic Asylums for the year ending 30th September, 1890. Presented to the Legislature 10th March, 1891. (*Printed.*)

No. 7.. Report upon the Common Gaols, Prisons and Reformatories of the Province, for the year ending 30th September, 1890. Presented to the Legislature 3rd April, 1891. (*Printed.*)

No. 8.. Report upon the Institution for the education of the Deaf and Dumb, Belleville, for the year ending 30th September, 1890. Presented to the Legislature 10th March, 1891. (*Printed.*)

No. 9.. Report upon the Institution for the instruction of the Blind, Brantford, for the year ending 30th September, 1890. Presented to the Legislature 10th March, 1891. (*Printed.*)

No. 10.. Report upon the Hospitals of the Province for the year ending 30th September, 1890. Presented to the Legislature 10th April, 1891. (*Printed.*)

No. 11.. Report upon the Houses of Refuge and Orphan and Magdalen Asylums for the year ending 30th September, 1890. Presented to the Legislature 20th April, 1891. (*Printed.*)

No. 12.. Report of the Fruit Growers Association for the year 1890. Presented to the Legislature 16th March, 1891. (*Printed.*)

No. 13.. Report upon the working of the Tavern and Shop Licenses Acts for the year 1890. Presented to the Legislature 10th March, 1891. (*Printed.*)

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No. 14.. Statements of the Bursar of Upper Canada College, of cash transactions, for the year ending 30th June, 1890. Presented to the Legislature 16th March, 1891. (*Printed.*)

No. 15.. Report of the Entomological Society of Ontario for the year 1890. Presented to the Legislature 16th March, 1891. (*Printed.*)

No. 16.. Report on Forestry, 1889-90. Presented to the Legislature 24th March, 1891. (*Printed.*)

No. 17.. Report of the Commissioner of Public Works for the year 1890. Presented to the Legislature 11th March, 1891. (*Printed.*)

No. 18.. Report of the Commission appointed to enquire into the Prison and Reformatory system of the Province. Presented to the Legislature 30th April, 1891. (*Printed.*)

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No. 19.. Public Accounts of the Province for the year 1890. Presented to the Legislature 16th March, 1891. (*Printed.*)

No. 20.. Estimates for the service of the Province until the Estimates for the year are finally passed. Presented to the Legislature 12th February, 1891. (*Not printed.*) Estimates for the year 1891. Presented to the Legislature 23rd March, 1891. (*Printed.*) Estimates for the service of the Province until the Estimates for the year are finally passed. Presented to the Legislature 31st March, 1891. (*Not printed.*) Supplementary Estimates for the year 1891. Presented to the Legislature 1st May, 1891. (*Printed.*)

No. 21.. Report of the Canadian Institute, 1890-91. Presented to the Legislature 3rd April, 1891. (*Printed.*)

No. 22.. Copy of an Order of His Honour the Lieutenant-Governor in Council respecting the payment of Surrogate Court Fees to His Honour Judge Davis under the provisions of 52 Vic., Cap. 10, Sec. 5. Presented to the Legislature 10th March, 1891. (*Not printed.*)

No. 23.. Return from the Queen's Printer as to the disposal of the Sessional Statutes. Presented to the Legislature 10th March, 1891. (*Not printed.*)

No. 24.. Statement from the Queen's Printer as to the disposal of the Revised Statutes. Presented to the Legislature 10th March, 1891. (*Not printed.*)

No. 25.. Copy of an Order in Council respecting the payment of Surrogate Court fees to His Honour Judge Muir, under the provisions of 52 Vic., Cap. 10, Sec. 5. Presented to the Legislature 11th March, 1891. (*Not printed.*)

No. 26.. Copy of an Order in Council approving of an agreement with the Rose Publishing Company for the publication of a High School French Reader. Presented to the Legislature 11th March, 1891. (*Not printed.*)

No. 27.. Copy of an Order in Council raising the High School of Morrisburg to the standing of a Collegiate Institute. Presented to the Legislature 11th March, 1891. (*Not printed.*)

No. 28.. Copy of an Order in Council raising the High School at Aylmer to the standing of a Collegiate Institute. Presented to the Legislature 11th March, 1891. (*Not printed.*)

No. 29.. Copy of an Order in Council approving of a By-law of the County of Simcoe, establishing a High School at the Town of Gravenhurst. Presented to the Legislature 11th March, 1891. (*Not printed.*)

No. 30.. Copy of an Order in Council conveying to Thomas Maitland Grover, certain land in the Village of Norwood in exchange for other lands conveyed by him to the Board of Education of Norwood. Presented to the Legislature 11th March, 1891. (*Not printed.*)

No. 31.. Copy of an Order in Council conveying to the North American Land Company, Limited, certain lands at one time vested in the Toronto Collegiate Institute Board in trust, but surrendered to Her Majesty. Presented to the Legislature 11th March, 1891. (*Not printed.*)

No. 32.. Copy of an order in Council approving of an agreement with the J. E. Bryant Company, Limited, for the publication of an agricultural text-book. Presented to the Legislature 11th March, 1891. (*Not printed.*)

No. 33.. Report on Compulsory Education in Canada, Great Britain, Germany and the United States. Presented to the Legislature 20th March, 1891. (*Printed.*)

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No. 35.. Report of the Department of Immigration for the year 1890. Presented to the Legislature 16th April, 1891. (*Printed.*)

No. 36.. Report of the Dairymen's Association for the year 1890. Presented to the Legislature 2nd May, 1891. (*Printed.*)

No. 37.. Report of the Ontario Agricultural and Experimental Union for the year 1890. Presented to the Legislature 22nd April, 1891. (*Printed as part of Agricultural College Report.*)

No 38.. Report of the Inspector of Division Courts for the year 1890. Presented to Legislature 20th March, 1891. (*Printed.*)

No. 39.. Return to an Order of the House of the nineteenth day of March, 1890, shewing copies of all correspondence on the subject of preparing or publishing school text books, with a statement of all sums paid in connection with the preparation or publication of school text books subsequent to that already brought down, with the award of the arbitrators thereon. Presented to the Legislature 20th March, 1891. Mr. *Preston.* (*Not printed.*)

No. 40.. Report of the Ontario Agricultural College and Experimental Farm for the year 1890. Presented to the Legislature 22nd April, 1891. (*Printed.*)

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No. 41. Analysis of Reports of County and Township Agricultural and Horticultural Societies in Ontario for the year 1889. Presented to the Legislature 6th April, 1891. (*Not printed.*)

No. 42.. Report of the Inspector of the Elgin House of Industry and Refuge for the year ending 31st October, 1891. Presented to the Legislature 24th March, 1891. (*Not printed.*)

No. 43.. Copy of an Order in Council respecting the commutation of fees payable under the Surrogate Courts Act to His Honour, Judge Toms, Judge of the County Court of the County of Huron. Presented to the Legislature 31st March, 1891. (*Not printed.*)

No. 44.. Statement of Sales of Timber Limits held 1st October, 1890. Presented to the Legislature 2nd April, 1891. (*Printed.*)

No. 45.. Return to an Order of the House of the seventeenth day of February, 1890, shewing the number of stationary steam engines and boilers in each of the municipalities of the Province, and for what purpose used. Presented to the Legislature 7th April, 1891. Mr. *Phelps.* (*Printed.*)

No. 46.. Return to an Order of the House of the twenty-eighth day of February, 1890, shewing, so far as the records of the Department of Crown Lands will enable the information to be given, the number, area and location of each timber berth or other territory now under license, the date when such berth or territory was first placed under license, and the name of the original licensee and of the person in whose name such license stood on the first day of January last. Also, shewing the bonus *per* square mile received for each such limit, and a rough map or plan shewing the area now under license. Presented to the Legislature 8th April, 1891. Mr. *Meredith.* (*Printed.*)

No. 47.. Copy of a Minute of the Department of Education dated 25th March, 1891, approving of certain rules with respect to the Salaries of Teachers in the Provincial Normal and Model Schools. Presented to the Legislature 13th April, 1891. (*Printed.*)

No. 48.. Return to an Address to His Honour the Lieutenant-Governor, of the twentieth day of March, 1891, praying that he will cause to be laid before the House a Return of copies of all correspondence, except that already brought down, between any member or officer of the Government of Ontario, and any member or officer of the Government of the Province of Quebec, with reference to the matters in dispute between the Province of Ontario and the Province of Quebec, or any of such matters, of all

memoranda or documents shewing the propositions made for the settlement of the said matters or any of them. Presented to the Legislature 14th April, 1891. Mr. *H. E. Clarke* (*Toronto.*) (*Printed.*)

No. 49.. Copy of an Order in Council respecting the commutation of fees of His Honour Judge Mosgrove, Junior Judge of the County Court of the County of Carleton, under the provisions of 52 Vic., Cap. 10, Sec. 5. Presented to the Legislature 15th April, 1891. (*Not printed.*)

No. 50.. Report of the Master of Titles for the year 1890. Presented to the Legislature 20th April, 1891. (*Printed.*)

No. 51.. Report of the Commissioners for the Queen Victoria Niagara Falls Park. Presented to the Legislature 28th April, 1891. (*Printed.*)

No. 52.. Report of the Provincial Board of Health for the year 1890. Presented to the Legislature 28th April, 1891. (*Printed.*)

No. 53.. Report of the Secretary and Registrar of the Province for the year 1890. Presented to the Legislature 29th April, 1891. (*Printed.*)

No. 54.. Return to an Order of the House of the thirteenth day of April 1891, for a copy of the Proclamation of the Returning Officer for the Electoral District of Parry Sound appointed to hold the last election of a member to represent the said Electoral District in this House, for holding the Election and fixing the places at which Polls were to be opened for taking the votes of the Electors thereat. A list of the places, if any, not named in the said Proclamation at which Polls were opened. A statement of the number of votes cast at any polling place not mentioned in the said Proclamation, shewing the number of votes cast for each candidate. Copies of the notices, if any, of the opening and holding of such last mentioned Polls, published by the Returning Officer, and a statement of the date and manner of the publication thereof. Presented to the Legislature 29th April, 1891. Mr. *Marter.* (*Not printed.*)

No. 55.. Return to an Address to His Honour the Lieutenant-Governor of the seventeenth day of April, 1891, praying that he will cause to be laid before this House a Return shewing what proceedings have been taken by the Government in investigating the business carried on by the Lion Provident and Life Association, with copies of any Reports or Orders in Council connected therewith. Presented to the Legislature 30th April, 1891. Mr. *Bishop.* (*Not printed.*)

No. 56.. Return to an Order of the House of the twenty-sixth day of February, 1890, for copies of the lease granted to the Keewatin Lumber Company or John R. Mather, of certain lands and islands in or near the Lake of the Woods, in the District of Algoma, and of all other leases granted of lands or islands in the said district prior to the year 1878. Also, shewing the revenue, if any, derived from the lands or islands so leased, or the timber cut therefrom in each year since such leases were made, shewing from whom received and on what account, in so far as the same are shewn in Department of Crown Lands. Also, a copy of the judgment pronounced in the High Court of Justice as to the rights of the said lessees under the said leases. Also, shewing the area of lands so placed under lease. Also, a list of all claims made for locations or mining rights in the territory covered by the said leases, and of the decisions of the Commissioner of Crown Lands thereon. And copies of all correspondence with reference

to the surrender by the lessees, or any of them, of the rights claimed under such leases, or any of such rights. Presented to the Legislature 1st May, 1891. Mr. *Meredith.* (*Not printed.*)

No. 57 . Statement of the Returns forwarded to the office of the Provincial Secretary of all the fees and emoluments received by the Registrars of Ontario for the year 1890, made in accordance with the provisions of R.S.O., 1887, Cap. 114, Sec. 100, with which are contrasted, receipts of the same nature in the years 1888 and 1889. (*Sessional Papers No. 57.*) Presented to the Legislature 1st May, 1891. (*Printed.*)

No. 58.. Report of the Inspector of Legal offices for the year 1890. Presented to the Legislature 1st May, 1891. (*Printed.*)

No. 59.. Return to an Order of the House of the twelfth day of March, 1890, shewing the lots, townships or other area, in the Electoral District of West Algoma, the timber of which has been sold. The dates when the same was sold; the names of the purchasers, and the prices paid. Shewing, also, what timber berths or other territory in the said district have been placed under license, or in respect of which permits to cut timber have been granted under the authority of the Province; the date when first placed under license, or permits first granted; the names of the original licensee or holder of the permit; the name of the present licensee or holder of the permit and the bonus *per* square mile received for each such berth or other territory. Presented to the Legislature 2nd May, 1891. Mr. *Meredith.* (*Not printed.*)

No. 60.. Report of the Inspector of Factories for the year 1890. Presented to the Legislature 2nd May, 1891. (*Printed.*)

No. 61.. Return to an Order of the House of the 29th day of April, 1891, shewing: 1. Total sales effected of Grammar School Lands in the Township of Proton, together with payments made on same from March 6th, 1861, to July 1st, 1867. 2. A statement of what yearly payments have been received from sales of Grammar School Lands in the Township of Proton since July 1st, 1867, and what payments were made by the Government to the Township of Proton as result of the same. Presented to the Legislature 2nd May, 1891. Mr. *McKechnie.* (*Printed.*)

No. 62.. Return to an Order of the House of the 29th day of April, 1891, for copies of any and all resolutions of the Council of the Township of Proton relative to Grammar School Lands situated in that Township, or correspondence of the Council regarding same. Also, copies of all petitions or memorials from ratepayers of the Township of Proton which turn to shew or prove that when they purchased Grammar School Lands from the Government it was with the distinct or implied understanding that one-fourth of the purchase money was to be returned to them, as a fund for public improvements within the Municipality. Also, any and all further correspondence regarding same not already brought down, Also, any correspondence with the late Crown Land Agent at Durham, in connection with the sale of said lands which would tend to prove or allege that a fourth of the purchase money was to be returned to the Municipality to form a fund for public improvements in the Township. Also, any other papers on the subject which have not been already brought down. Also, an account of the sums paid to other townships in respect of Grammar School Lands therein Presented to the Legislature 2nd May, 1891. Mr. *McKechnie.* (*Printed.*)

No. 63.. Return to an Order of the House of the 29th day of April, 1891, shewing the total collections from Confederation to the 31st day of December, 1890, on Common School Lands, together with the percentage paid to the municipalities on account of the Land Improvement Fund. Presented to the Legislature 2nd May, 1891. Mr. *Gibson* (*Huron.*) (*Printed.*)

No. 64.. Return to an Order of the House of the 29th day of April, 1891, containing the report of a Committee appointed by the Senate of the University of Toronto on the 10th day of January, 1891, and by the Board of Trustees of the same Institution on the 13th day of January, 1891, to report upon the present and prospective revenue and the most urgent pecuniary requirements of the University and of University College and as to the time, mode and order in which these requirements should be dealt with. Presented to the Legislature 2nd May, 1891. Mr. *Balfour.* (*Printed.*)

No. 65.. Return to an Order of the House of the 29th day of April, 1891, for copies of the judgments of Chief Justice Galt quashing the local option liquor by-laws adopted by the municipalities of Oakland, South Norwich and London West, under the authority of Section 18, of Cap. 56, of the Statutes of Ontario, 1890. Presented to the Legislature 2nd May, 1891. Mr. *Allan.* (*Printed.*)

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No. 66.. Report of the Bee-keepers Association for the year 1890. Presented to the Legislature 2nd May, 1891. (*Printed.*)

No. 67.. Report of the Bureau of Industries for the year 1890. Presented to the Legislature 2nd May, 1891. (*Printed.*)

No. 68.. Report of the Inspector of Mines, 1890. Presented to the Legislature 2nd May, 1891. (*Printed.*)

REPORT

OF THE

COMMISSIONER OF CROWN LANDS

OF THE

PROVINCE OF ONTARIO

FOR THE YEAR

1890.

PRINTED BY ORDER OF THE LEGISLATIVE ASSEMBLY.

TORONTO:
PRINTED BY WARWICK & SONS, 68 AND 70 FRONT STREET WEST.
1891.

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REPORT

OF THE

COMMISSIONER OF CROWN LANDS

OF THE

PROVINCE OF ONTARIO,

FOR THE YEAR 1890.

To His Honor the Honorable Sir Alexander Campbell, K. C. M. G.,
Lieutenant Governor of the Province of Ontario.

May it Please Your Honor :

As required by law, I submit for the information of your Honor and the Legislative Assembly a Report for the fiscal year ending on the 31st December, 1890, of the management, etc., of the Crown Lands of the Province.

CLERGY LANDS.

The area of these lands sold during the year was 780 acres, aggregating in value $1,219.76. The amount collected on account of these and former sales was $6,037.88. (See Appendix No. 3 page 5.)

CROWN LANDS.

During the past summer considerable interest was excited by discoveries from time to time of large deposits of nickel, a valuable economic mineral. These discoveries were made in the already well known Sudbury region, and were so extensive as to create a sort of boom, which led to numerous applications to the Department for leave to purchase mining lands. By Order in Council, dated the 29th November, 1890, the nickel bearing region was withdrawn from sale or location until further notice.

The area of Crown Lands sold during the year was 50,045 acres, aggregating in value $79,847,39. The collection on account of these and sales of former years amounted to $74,031.78. (See Appendix No. 3 page 5.)

COMMON SCHOOL LANDS.

The area of these lands sold during the year was 220 acres, aggregating in value $766.50. The collection on account of these and former sales amounted to $11,758.24. (See Appendix No. 3 page 5.)

GRAMMAR SCHOOL LANDS.

The number of acres sold during the year was 534, aggregating in value $367.00. The collection on account of these and former sales was $1,538.27. (See Appendix No. 3 page 5.)

RAILWAY LANDS.

Under "Railways Aid Act" of 1889, 52 Vic., Chap. 35., certain lands were set apart to be sold for the purpose of forming a fund to recoup the Province in respect of monies expended in aiding Railways—of these lands 9,406 acres were sold aggregating in value $18,577.20. The collections were $11,562.56. (See Appendix No. 3 page 5.)

COLLECTIONS AND REVENUE.

The total collection of this Department on account of all sources of Revenue was $1,113,052.29. (See Appendix No. 4 page 6.)

DISBURSEMENTS.

The total disbursements of the Department on account of all services and expenditure was $290,953.10. (See Appendix, No. 6 page 8.)

WOODS AND FORESTS.

The total collections for the year amounted to $916,155.67, which includes $135,479.53 on account of bonuses, leaving the revenue from timber dues, ground rent, etc , to be $780,676.14.

The revenue from Woods and Forests is somewhat below the estimate, which is accounted for by the collapse in the square and waney board timber trade, there being very little demand for this class of timber during the past year. While, therefore, the quantity of timber estimated was got out, it was unsaleable—is still in the hands of the producers, and the dues remain unpaid. There was also a depression in the sawed lumber trade during part of the season, and this, together

with the financial stringency which prevailed later on, made collections somewhat slow. The reduction of the import duty upon sawn lumber going into the United States from $2 to $1 per thousand feet board measure came too late in the year to have very much effect on last season's business, although there was a stiffening towards the close of the year, due, no doubt, to the reduction in question. The quantity of timber being got out this year is very small, and there is also a reduction in the output of logs. It is reasonable, therefore, to expect for the coming season a fair business at remunerative prices, and that the reduction of the American import duty will enlarge our market to some extent—more particularly for the coarser grades of lumber.

In order to enable those owning mills in the North-west part of the province to obtain supplies of timber, in harmony with the policy prevailing in other parts, it was determined to hold a sale of a limited area of timber berths as soon as the necessary surveys and explorations could be completed. With this object in view, an adequate staff was placed in the field, and the necessary information was obtained to warrant the holding of a timber sale on the first of October last. There was a large attendanee at the sale, and fair prices were realized. Four hundred and eighty-five miles were offered, all of which, except 18½ miles, were in the territory west of Thunder Bay. Three hundred and forty-three and three-quarter miles were knocked down on the day of sale, for $321,956.25, and thirty-three miles were sold subsequently at the upset price, realizing $24,300, making a total mileage sold of 376¾, realizing $346,256.25, or an average of $919.06 per mile bonus for the mere right to obtain license. There has been paid on account $110,729.53, leaving outstanding $235,526.72.

FIRE RANGING.

This service continues to give satisfaction and is more largely taken advantage of from year to year. There were no fires during the past year.

There were 83 Rangers on duty during the dangerous part of the season, and the total cost of the service was $17,525.43, one half of which is refundable by the licensees.

FISHERIES.

The reports received from Fishery Overseers and others lead me to believe the law was fairly well observed.

The Revenue, &c., from permits was $441.00.

GAME LAWS.

Under the amendment to the Game Law, which requires foreigners to take out permits to hunt deer, 19 permits were issued, the revenue from which amounted to $190.

FREE GRANTS.

Last year there were 153 townships open for settlement, and during this year the township of Cavendish has been added.

During the year just closed 610 locations were made on 83,273 acres of land, and 53 locatees purchased 2,345 acres; 456 patents were issued to locatees. (See Appendix, No. 9, page 16.)

CROWN SURVEYS.

The following surveys of townships have been carried out this year:

In the District of Nipissing the townships of Barron and Guthrie have been sub-divided into farm lots of 100 acres each; the townships of Appelby, Blain, Charlton, Cleland, Garrow, Gladman, Hawley, Lockhart, Lyman and Sharpe into lots of 320 acres each. In the District of Algoma the townships of Shakespeare and Totten, have been sub-divided into lots of 320 acres each; and the Boundary line between the Districts of Thunder Bay and Rainy River has been run for a distance of 120 miles north from the base line run in 1888, from the township of Strange in the district of Thunder Bay to Hunter's Island in the District of Rainy River. The outlines of a number of Timber Berths in the Districts of Algoma, Thunder Bay and Rainy River have been surveyed, and several minor surveys have also been executed.

The returns of the above named surveys have, so far as received, been examined and in most cases closed. The particulars of these surveys will be found in Appendices Nos. 14 and 15, pages 24 and 25 inclusive.

The Surveyors' reports in relation to the surveys will be found in Appendices Nos. 20 to 34, pages 33 to 53 inclusive.

MUNICIPAL SURVEYS.

The Department has during the year issued instructions for a survey in the township of Nepean, on the petition of the Municipal Council of the Corporation thereof; and has during the year confirmed ten Municipal Surveys in the township of Barton, Clinton, Downie, Enniskillen, Nepean, Pelham, Plympton, Sombra, St. Vincent and Wainfleet.

The particulars relating to these surveys will be found in Appendices Nos. 12 and 13, pages 21 to 23 inclusive.

MINERAL SURVEYS.

The General Mining Act requires that applicants to purchase mining lands in unsurveyed territory, shall file Surveyor's plans, field notes, and descriptions by metes and bounds of their locations in the Department, before any sale is carried

out. Under this Statutory regulation, a number of applicants in the Districts of Algoma, Nipissing, Rainy River and Thunder Bay, have filed plans, etc., etc., and an area of upwards of 14,000 acres has been sold and patented to them, for which upwards of $28,000 has been received.

The particulars relating to these surveys and sales will be found in Appendices Nos. 16 and 17, pages 26 to 29 inclusive.

COLONIZATION ROADS.

The work done during the year was as follows:—Miles of new road constructed—180; Miles of road repaired—400; Bridges erected—30; Bridges repaired—12. The work done was carefully inspected and reported to be of a satisfactory and substantial character.

The total expenditures was $127,577.60 of which certain items amounting to $2,770.20 were refunded, leaving the net Departmental expenditure to be $124,807.40.

The work of the Department is rapidly growing, owing to the greatly increaseed area over which control and supervision are now exercised. The region formerly known as the Disputed Territory has practically doubled the area to be administered by this Department, the affairs of which, as to the adjustment of disputes, issuing of titles, supervision of timber resources, explorations and surveys, construction of colonization roads and bridges, etc., entail enormous labor and require careful attention, and the work in this connection may be said to be in its infancy. By the amendment of last Session to The Timber Slide Companies Act, the supervision and control of all companies in existence, or being formed, with the object of facilitating the transmission of timber down the rivers and streams of the Province, was transferred from the Department of Public Work to this Department, and added materially to its responsibilities and work. The Cullers Act of last Session, with the administration of which this Department is also charged, gave rise to a good deal of correspondence during the year. Perhaps the best indication of the volume of work is afforded by the correspondence of the Department, which aggregated last year some 39,000 letters received and answered, containing some 34,000 enclosures. The actual increase over the previous year was in letters and enclosures nearly 3,500.

Respectfully submitted,

A. S. HARDY,
Commissioner.

Department of Crown Lands,
Toronto, 31st December, 1890.

APPENDICES.

APPENDIX NO. 1.

Return of Officers and Clerks in the Department of Crown Lands, for the year 1890.

Branch.	Name.	Designation.	When Appointed.	Salary per Annum.	Remarks.
				$ c.	
	Hon. A. S. Hardy	Commissioner	1889, January 19	4,000 00	
	Aubrey White	Assistant Commissioner	1882, January 1	2,800 00	
	George Kennedy	Law Clerk	1872, February 1	2,000 00	
	F. Yeigh	Shorthand Writer and Clerk	1880, March 1	1,250 00	
Free Grant and Sales	A. Kirkwood	Chief Clerk	1854, March 21	1,900 00	
	J. J. Murphy	Clerk in charge of Free Grants	1872, May 1	1,300 00	
	Julian Sale	Clerk	1871, August 5	950 00	
	E. S. Williamson	"	1889, May 1	750 00	
	C. J. M. Hardy	"	1890, May 31	700 00	
Surveys, Patents and Roads	G. B. Kirkpatrick	Chief Clerk	1866, January 30	1,900 00	
	W. Revell	Clerk	1871, October 2	1,200 00	
	W. F. Lewis	"	1872, February 5	1,000 00	
	J. M. Grant	Chief Clerk, Patents	1860, May 12	1,400 00	
	Pedro Alma	Clerk	1871, August 1	1,200 00	
	Henry Smith	Superintendent of Colonization Roads	1881, January 1	1,900 00	
	C. Cashman	Clerk	1872, September 1	1,150 00	
	J. H. Bradshaw	"	1884, June 1	850 00	
Woods and Forests	G. B. Cowper	Chief Clerk	1857, October 14	2,000 00	Resigned 1st June, 1890.
	J. A. G. Crozier	"	1867, December 1	1,650 00	
	Theo. C. Taylor	Clerk	1888, August 1	1,350 00	
	H. R. Hardy	"	1883, November 1	1,100 00	
	H. E. Rudge	"	1881, September 1	950 00	
	P. J. Durkin	"	1888, October 1	800 00	
	Alex. McLaren	"	1890, May 22	800 00	
	J. B. Pardee	"	1890, May 8	700 00	

APPENDXI NO. 1.—*Continued.*

RETURN of Officers and Clerks in the Department of Crown Lands, for the year 1890.

BRANCH.	Name.	Designation.	When Appointed.	Salary per Annum.	Remarks.
				$ c.	
Accountants	D. G. Ross	Accountant	1861, April 15	1,700 00	
	R. H. Browne	Chief Clerk, Agents' Returns	1862, May 14	1,400 00	Resigned May, 1890.
	E. Leigh	Clerk	1873, December 20	1,200 00	
	J. J. Kelly	"	1888, March 19	800 00	
	C. P. Higgins	"	1873, July 1	1,100 00	
	C. S. Jones	Registrar	1890, May 22	1,400 00	
	J. Bradshaw	Office Keeper	1852, March 27	500 00	Resigned Aug., 1890.
	A. McDonald	Messenger	1862, May 19	550 00	
	F. Frank	Fireman	1886, December 1	500 00	
	D. Kinnan	Night Watchman	1873, April 1	500 00	

D. GEO. ROSS,
Accountant.

AUBREY WHITE,
Assistant Commissioner.

DEPARTMENT OF CROWN LANDS,
TORONTO, 31st December, 1890.

APPENDIX No. 2.

List of Crown Land Agents for the Disposal of Free Grants, 1890.

Name.	District or County.	Date of Appointment.	Salary per Annum.	Remarks.
			$ c.	
Anderson, D	Part of Peterborough	1870, November 21	500 00	
Best, S. G	" Parry Sound District	1875, March 23	500 00	
Brown, C. P	" Algoma District	1872, June 25	500 00	
Cockburn, J. D	" Nipissing District	1884, May 21	500 00	Agent for Sale of Lands.
Day, J. F	" Algoma District	1875, July 19	500 00	
Dawson, G. W	" Frontenac and Addington	1882, February 17	500 00	
Dill, J. W	" District of Muskoka	1888, August 1	500 00	
Duncan, A. G	St. Joseph Island	1883, December 23	200 00	Resigned, August 1890.
Fielding, W	Part of Victoria	1882, February 23	500 00	
Gilligan, B. J	" Nipissing District	1884, March 26	500 00	
Hamilton, G	St. Joseph Island	1890, September 20	200 00	
Handy, E	Part of Parry Sound District	1879, January 3	500 00	
Kennedy, J. D	" Renfrew	1885, October 30	500 00	
Mackay, T	" Parry Sound District	1881, December 5	500 00	
Macpherson, R	" Frontenac	1871, July 18	500 00	Agent for Sale of Lands
McDonald, D. G	" Algoma District	1888, December 3	500 00	Agent for Sale of Lands.
Nichols, W. L	" Algoma District	1885, August 27	500 00	
Reeves, J	" Nipissing District	1872, February 12	500 00	
Ruttan, J. F	" Thunder Bay District	1889, May 16	400 00	Agent for Sale of Lands.
Ryan, T. J	" Algoma District	1888, June 15	500 00	
Scarlett, J. S	" Parry Sound District	1880, June 17	500 00	
Stewart, C. R	" Hastings and Peterborough	1882, May 1	500 00	
Tait, J. R	" Hastings	1869, May 28	500 00	
Whelan, J	" Renfrew	1884, September 19	500 00	

D. GEO. ROSS,
Accountant.

AUBREY WHITE,
Assistant Commissioner.

DEPARTMENT OF CROWN LANDS,
TORONTO, 31st December, 1890.

APPENDIX No. 3.

STATEMENT of Lands Sold, Amount of Sales, and Amount of Collections for the year 189 0

SERVICE.	Acres Sold.	Amount of Sales.	Amount of Collections.
		$ c.	$ c.
Railway Lands	9,406½	18,577 20	11,562 56
Crown Lands	50,045	79,847 39	74,031 78
Clergy Lands	780 82/100	1,219 76	6,037 88
Common School Lands	220¾	766 50	11,758 24
Grammar School Lands	534½	367 00	1,538 7
Total	60,996 87/100	100,777 85	104,928 73

D. GEO. ROSS,
Accountant.

AUBREY WHITE,
Assistant Commissioner.

DEPARTMENT OF CROWN LANDS,
TORONTO, 31st December, 1890.

APPENDIX No. 4.

STATEMENT of the Gross Revenue of the Department of Crown Lands for the year 1890.

SERVICE.	$	$ c.
Land Collections:		
Railway Lands	11,562 56	
Crown Lands	74,031 78	
Clergy Lands	6,037 88	
Common School Lands	11,758 24	
Grammar School Lands	1,538 27	
Rent	130 00	
In Suspense	80,512 40	
		185,571 13
Woods and Forests.		
Timber Dues	722,580 14	
Ground Rent	58,096 00	
Bonus	135,479 53	
		916,155 67
Casual fees	397 38	
Surveyor's fees	104 80	
Fishing license fees	441 00	
Hunting license fees	190 00	
		1,193 18
Expenditure Refunds:		
Forest Fire Prevention	6,604 06	
Destitute Settlers	52 80	
Inspections	126 75	
Colonization Roads	2,770 20	
Surveys	578 50	
		10,132 31
		1,113,052 29

D. GEO. ROSS,
Accountant.

AUBREY WHITE,
Assistant Commissioner.

DEPARTMENT OF CROWN LANDS,
TORONTO, 31st December, 1890.

APPENDIX No. 5.

Statement of the Receipts of the Crown Lands which are considered as Special Funds.

SERVICE.	$ c.	$ c.
Clergy Lands:		
Principal	3,515 91	
Interest	2,521 97	
		6,037 88
Common School Lands:		
Principal	4,646 40	
Interest	7,111 84	
		11,758 24
Grammar School Lands:		
Principal	914 47	
Interest	623 80	
		1,538 27
Railway Lands:		
Principal		11,562 56
		30,896 95

D. GEORGE ROSS,
Accountant.

AUBREY WHITE,
Assistant Commissioner.

Department of Crown Lands,
Toronto, 31st December, 1890.

APPENDIX No. 6.

Statement of the Gross Disbursements of the Department of Crown Lands for the year 1890.

SERVICE.	$ c.	$ c.	$ c.
AGENTS' SALARIES AND DISBURSEMENTS.			
Salaries—Land.			
Anderson, D	500 00		
Best, S. G	500 00		
Brown, C. P	500 00		
Cockburn, J. W	500 00		
Dawson, G. W	500 00		
Dill, J. W	500 00		
Day, J. F	500 00		
Duncan, A. G	200 00		
Fielding, W	500 00		
Gilligan, B. J	500 00		
Handy, E	500 00		
Kennedy, J. D	500 00		
Macdonald, D. G	500 00		
Mackay, T	500 00		
Macpherson, R	500 00		
Nichols, W. L	500 00		
Reeves, J	500 00		
Ruttan, J. F	400 00		
Ryan, T. G	500 00		
Scarlett, J. S	500 00		
Stewart, C. R	500 00		
Tait, J. R	500 00		
Whalen, J	500 00		
		11,100 00	
Salaries—Timber.			
Barnes, Geo	675 00		
Campbell, P. C	1,600 00		
Margach, W	1,600 00		
Macdonald, D. F	1,600 00		
Macdonald, W. J	1,500 00		
Darley, E. J., clerk	900 00		
Larose, S. C., "	819 40		
J. B. Pardee, "	386 66		
Mackay, John	800 00		
Nicholson, B., clerk	506 25		
Munro, H	1,200 00		
McWilliams, J. B	2,000 00		
Tassie, D	100 00		
		13,687 31	
Mines.			
Slaght, A., Inspector		200 00	
Fisheries.			
Clark, N	50 00		
Flanagan, N	75 00		
Little, John T	50 00		
Moore, F. J	50 00		
McDermott, B	50 00		
McKewan, S. R	50 00		
Smith, R. R	50 00		
Wilmott, J. H	50 00		
		425 00	
Carried forward			

APPENDIX No. 6.—*Continued.*

Statement of the Gross Disbursements of the Department of Crown Lands for the year 1890.

SERVICE.	$ c.	$ c.	$ c.
Brought forward			
AGENTS' DISBURSEMENTS.			
Land.			
Anderson, D.	7 30		
Brown, C. P.	8 50		
Cockburn, J. D.	20 29		
Dill, J. W.	35 62		
Day, J. F.	9 08		
Duncan, A. G	6 22		
ielding, W.	5 95		
Handy, E.	23 24		
Kennedy, J. D.	12 66		
Mackay, T.	9 58		
Nichols, W. L	5 26		
Ruttan, J. F.	29 00		
Ryan, T. J.	62 00		
Scarlett, J. S.	15 00		
Stewart, C. R.	27 28		
Tait, J. R.	8 45		
Whalen, J.	5 91		
		291 34	
Timber.			
Barnes, Geo.	185 80		
Campbell, P. C.	251 90		
Margach, W.	537 56		
Macdonald, D. F.	335 00		
Macdonald, W. J.	1,111 23		
Mackay, John	839 69		
Munro, H.	150 00		
McWilliams, J. B	258 60		
		3,669 78	
Miscellaneous.			
Allan, B., Inspection	5 00		
Elliott, H., "	64 25		
Henderson, J., "	18 00		
Jarvis & Hardy, re claim commission at Rat Portage, etc.	310 00		
Margach, M., services as acting agent	125 00		
Murphy, J. J., travelling expenses	41 50		
McRae, J., Inspection	4 50		
Nickerson, W., "	16 50		
Ross, D. G., travelling expenses	25 00		
Ryan, W. H., Inspection	19 50		
Suasdell, J., "	6 20		
Stephenson, E. F., "	30 00		
Stewart, J. McK., "	10 00		
Taylor, T. C., travelling expenses	19 00		
Yeigh, F., "	22 10		
" Inspection of Agencies and expenses	259 00		
White, A., travelling expenses	188 00		
Yuell, A. B., Inspecting	8 00		
		1,162 55	
			30,535 98
Carried forward			

APPENDIX No. 6.—*Continued.*

Statement of the Gross Disbursements of the Department of Crown Lands for the year 1890.

SERVICE.	$ c.	$ c.	$ c.
Brought forward			
Wood Ranging and Inspection of Timber Lands.			
Beck, Geo		1,151 35	
Brady, John		805 00	
Bremner, J. L		1,262 25	
Brennan, P		705 00	
Brooks, A		638 40	
Campbell, B. J		257 90	
Campbell, P. C		200 00	
Coville, J		141 00	
Cunningham, J		946 17	
Fraser, D		1,150 00	
Gardner, J		1,370 00	
Garrow, E		100 00	
Halliday, F		1,277 50	
Halliday, J		797 00	
Johnson, S. M		1,600 87	
Kennedy, John		1,081 72	
Ludgate, T		1,204 40	
Margach, W., explorations *re* timber sale		5,787 00	
Moore, D. H		1,205 85	
McCogherty, P		881 60	
McGown, T		560 00	
McGown, W		1,047 15	
McRae, J. F		222 00	
Oliver, W		79 50	
Paget, Geo		1,784 51	
Regan, John, *re* timber sale, etc		2,108 07	
Robinson, A		50 00	
Robinson, W		1,345 55	
Roschow, T		268 20	
Russell, W		800 00	
Shaw, Jos		1,114 16	
Smith, J. W		1,195 25	
Stephens, J. J		150 00	
Sullivan, J		100 00	
Taylor, T. W		220 00	
Thompson, R		840 00	
Turgeon, J. B		730 00	
White, J. B		1,105 00	
			36,282 40
Fire Ranging.			
Aussaint, T		210 00	
Austin, C		262 00	
Austin, J		262 00	
Boland, A		206 00	
Boland, J. J		216 00	
Boland, W		214 00	
Breeze, J		262 00	
Bremner, W		214 00	
Bromley, T		262 00	
Burkitt, L		363 00	
Brown, J. S		492 00	
Cochrane, J		192 00	
Coghlin, J		262 00	
Columbus, W		188 00	
Cameron, J		312 00	
Conway, J		262 00	
Carried forward			

APPENDIX No. 6.—*Continued.*

Statement of the Gross Disbursements of the Department of Crown Lands for the year 1890.

SERVICE.	$ c.	$ c.	$ c.
Brought forward			
Fire Ranging.—Continued.			
Creswell, W.		94 00	
Donally, R. S		176 00	
Dufond, I.		140 00	
Elcome, S		258 00	
Elliott, W.		104 00	
Elmhurst, W		188 00	
Fisher, D		264 00	
Fleming, Geo		208 00	
Foster, M		262 00	
Gagnon, A		524 00	
Garr, J		105 00	
Garvey, P		262 00	
Gilroy, S		262 00	
Granbarger, T		262 00	
Grimes, G		260 00	
Haley, C		262 00	
Hoff, J. S. M		240 00	
Hostetter, J. B		113 00	
Howden, F		262 00	
Johnson, R. W		262 00	
Johnston, W		238 00	
Kemp, A		78 00	
Kirby, T		84 00	
McCormack, J. C		136 00	
McDonald, J. W		262 00	
McDonald, W. H		104 00	
McDougall, D		156 00	
McGown, W		88 00	
McGregor, J		262 00	
McGuey, D		308 59	
McInnis, J		212 00	
McIntosh, D		208 00	
McKay, A		180 00	
McMullin, J		524 00	
McNabb, W. C		262 00	
McNeil, J		262 00	
Maves, W		226 00	
Munro, H		150 00	
Murphy, J		260 00	
Nevers, C		484 00	
O'Grady, T. L		262 00	
O'Neil, A. J		150 00	
Oram, J		262 00	
Ploura, C		422 00	
Parker, J		130 00	
Prince, A		262 00	
Rawson, C. E		112 00	
Ryan, R		90 00	
Sage, W		142 00	
Sedgwick, J		152 00	
Shea, M		211 50	
Sheehan, P		260 00	
Skuce, T		290 54	
Smith, A. C		492 80	
Streatfield, L. C		234 00	
Stewart, J. E		88 00	
Carried forward			

APPENDIX No. 6.—*Concluded.*

Statement of the Gross Disbursements of the Department of Crown Lands for the year 1890.

SERVICE.	$ c.	$ c.	$ c.
Brought forward			
Fire Ranging.—Continued.			
Thomson, F. H.		264 00	
Vannier, N.		267 00	
Young, W.		262 00	
			17,525 43
Refunds			16.762 27
Colonization Roads			127,577 60
Surveys			17,813 28
Board of Surveyors			280 00
Contingencies.			
Printing and binding		1,886 93	
Stationery		1,642 45	
Postage and telegraphing		1,389 90	
Office keeper		291 00	
Messenger		590 00	
Fireman		558 75	
Night watchman		500 00	
Extra clerks		1,800 90	
Auctioneer, timber sale		300 00	
Subscriptions and advertising		4,702 95	
Sundries		513 26	
			14,176 14
			290,953 10

D. GEORGE ROSS,
Accountant.

AUBREY WHITE,
Assistant Commissioner.

Department of Crown Lands,
Toronto, 31st December, 1890.

APPENDIX No. 7.

Woods and Forests.

Statement of Revenue collected during the year ending 31st of December, 1890.

	$ c.	$ c.
Amount of Ottawa collections	260,328 29	
" " at Quebec	23,000 30	
		283,328 59
Amount of Belleville District collections	92,193 51	
		92,193 51
Amount of Western District collections at Department	517,532 57	
" " " at Quebec	23,101 00	
		540,633 57
Total		916,155 67

AUBREY WHITE,
Assistant Commissioner.

J. A. G. CROZIER,
Chief Clerk in Charge.

Department of Crown Lands,
Woods and Forests Branch,
Toronto, 31st December, 1890.

APPENDIX

WOODS AND

STATEMENT of Timber and Amounts accrued from Timber Dues, Ground

QUANTITIES AND

AGENCIES.	Area covered by Timber Licenses.	Saw Logs.				Square	
		White Pine.		Other.		White Pine.	
	Square Miles.	Pieces.	Feet.	Pieces.	Feet.	Pieces.	Feet.
Western Timber District....	7,278	2,880,630	268,632,108	10,535	564,199	30,491	1,672,946
Ottawa Timber District.....	4,777	1,568,144	193,338,688	11,707	1,380,720	30,251	1,473,100
Belleville Timber District...	1,500	583,456	57,245,005	21,089	1,363,563	1,554	80,118
Total.....	13,555	5,032,230	519,215,801	43,331	3,308,482	62,296	3,226,164

GENERAL STATEMENT OF

AGENCIES.	Hemlock.		Railway Ties.	Cordwood.		Pile Timber.		Telegraph Poles.	Traverses.	Lineal Cedar.
	Pcs.	Feet.	Pieces.	Hard Cords.	Soft Cords.	Pcs.	Feet B. M.	No.	Pcs.	
Western Timber District....	.....	.....	619,418	3,928	24,810	2,383	11,664	....	.....	.....
Ottawa Timber District.....	33	459	27,331	210	849	.....	.....	91	1,225	88,320
Belleville Timber District...	1,249	51,756	25,661	60	114	.....	.....	377	.....	74,026
Total.....	1,282	52,215	672,410	4,198	25,773	2,383	11,664	468	1,225	162,346

J. A. G. CROZIER,
Chief Clerk in Charge.

DEPARTMENT OF CROWN LANDS, WOODS AND FORESTS BRANCH,
TORONTO, 31st December, 1890.

No. 8.

FORESTS.

Rent and Bonus during the year ending 31st of December, 1890.

DESCRIPTION OF TIMBER.

Timber.		Boom and Dimension Timber.		Ash, Elm and Basswood.		Oak.		Tamara	
Red Pine.									
Pieces.	Feet.	Pieces.	Feet.	Pieces.	Feet.	Pieces.	Feet.	Pieces.	Feet.
694	29,709	82,096	21,982,953	A. 16 E. 25 B. 2	516 1,201 79	.....	.....	1	39
3,551	136,756	43,752	6,389,645	A. 83 B. 9 E. 29	3,074 335 1,540	.....	.....	5	186
.....	.....	23,015	4,965,200	A. 45 B. 13 E. 65	1,020 346 2,551	82	1,865	111	5,249
4,245	166,465	148,863	33,337,798	A. 144 E. 119 B. 24	4,610 5,292 760	82	1,865	117	5,474

TIMBER, ETC.—*Continued.*

Cedar Posts.	Bolts.	Head Blocks.	Amounts Accrued.				
Cords.	Cords.	Pieces.	Interest, Trespass, etc.	Timber Dues.	Ground Rent.	Bonus.	Total.
			$ c.	$ c.	$ c.	$ c.	$ c.
.....	2,110	99	6,465 48	377,374 70	31,550 00	135,479 53	550,869 71
.....	1,412	....	666 52	234,179 49	21,447 00	.....	256,293 01
587	38	....	188 53	66,321 78	5,099 00	.....	71,609 31
587	3,560	99	7,320 53	677,875 97	58,096 00	135,479 53	878,772 03

AUBREY WHITE,
Assistant Commissioner.

APPENDIX No. 9.

RETURN of the number of locatees and of acres located; of purchasers and of acres sold; of lots resumed for non-performance of the settlement duties, and of patents issued under the Free Grants and Homesteads Acts during the year 1890.

TOWNSHIP.	DISTRICT OR COUNTY.	AGENT.	Number of persons located.	Number of acres located.	Number of purchasers.	Number of acres sold.	Number of lots the locations of which have been cancelled.	Number of patents issued.
Baxter	Muskoka	J. W. Dill, Bracebridge	2	153				
Brunel			3	372			5	3
Chaffey			9	1153	1	2	10	3
Draper			5	525			5	2
Franklin			8	834	2	139	6	5
Macaulay			4	598			4	3
Medora			15	2302	1	50	23	7
Monck			1	200	1	71	1	3
Morrison			6	777			13	1
Muskoka			5	714			9	3
McLean			4	436	1	100	7	
Oakley			4	593			2	3
Ridout			3	525			3	1
Ryde			3	336			1	2
Sinclair			10	1554	1	11	5	4
Sherbourne			1	100				2
Stephenson							3	4
Stisted			3	503			5	6
Watt			5	490			3	1
Wood			10	1745			8	
Cardwell	Parry Sound	Mrs. T. Mackay, Parry Sound	7	1000			11	2
Carling			1	76			2	3
Christie							2	3
Ferguson								
Foley								4
Hagerman			1	173			3	2
Humphrey			2	320			5	2
Monteith			1	100	2	73	1	4
McConkey			1	200			2	2
McDougall								1
McKenzie			3	445			7	1
McKellar			1	91			1	3
Shawanaga								
Wilson			2	187			1	

Chapman			.....	.....	1	16	1	3
Croft			.....	.....	.....	.....	.....	5
Ferrie			4	784	.....	.....	1	.....
Gurd			3	592	.....	.....	1	1
Lount			10	1377	.....	.....	1	1
Machar	Parry Sound	S. G. Best, Maganetawan	18	2617	.....	.....	7	10
Mills			3	386	.....	.....	.....	.....
Pringle			1	200	.....	.....	.....	.....
Ryerson			6	1199	1	6	5	29
Spence			2	299	.....	.....	3	6
Strong			11	1479	1	99	5	20
Armour			5	641	.....	.....	6	3
Bethune			5	781	.....	.....	8	7
Joly			4	687	1	4	9	4
McMurrich	Parry Sound	E. Handy, Emsdale	3	506	2	8	2	12
Perry			6	752	.....	.....	1	16
Proudfoot			3	401	.....	.....	3	1
Hardy			3	588	.....	.....	.....	1
Himsworth			27	4092	2	72	34	10
Laurier	Parry Sound	J. S. Scarlett, Powassan	19	2901	1	100	21	1
Nipissing			7	1100	.....	.....	7	2
Patterson			.....	.....	.....	.....	.....	2
Anson			.....	.....	.....	.....	.....	.....
Glamorgan			5	617	.....	.....	6	4
Hindon			.....	.....	.....	.....	.....	.....
Lutterworth	Haliburton	Wm. Fielding, Minden	6	754	.....	.....	5	5
Minden			3	456	.....	.....	.....	1
Stanhope			.....	339	.....	.....	2	2
Snowdon			2	300	1	43	9	5
Anstruther	Peterboro'		3	500	.....	.....	1	1
Chandos	do		7	698	.....	.....	3	8
Cardiff	Haliburton	D. Anderson, Apsley	7	1002	.....	.....	8	5
Monmouth	do		16	2283	1	66	19	5
Cavendish	Peterboro'		27	3710	1	3	.....	.....
Galway	do		7	869	1	115	7	11
Bangor	Hastings	C. R. Stewart, Haliburton	7	621	1	4	4	4
McClure	do		1	187	.....	.....	1	.....
Wicklow	do		1	99	.....	.....	.....	1
Carlow			1	100	1	1	1	2
Cashel			2	211	.....	.....	3	2
Dungannon			4	531	.....	.....	4	3
Faraday			14	2055	.....	.....	11	4
Herschel	Hastings	J. R. Tait, L'Amable	6	523	.....	.....	6	2
Limerick			3	400	.....	.....	1	1
Mayo			8	1405	1	14	4	3
Monteagle			18	2628	.....	.....	12	3
Wollaston			9	1092	.....	.....	7	11

APPENDIX No. 9.—*Continued.*

RETURN of the number of locatees and of acres located, etc.

TOWNSHIP.	DISTRICT OR COUNTY.	AGENT.	Number of persons located.	Number of acres located.	Number of purchasers.	Number of acres sold.	Number of lots the locations of which have been cancelled.	Number of patents issued.
Abinger	Addington	G. W. Dawson, Plevna						
Denbigh	do							8
Canonto, South	Frontenac							4
do North	do							
Clarendon	do						2	11
Miller	do						2	1
Palmerston	do		2	300				3
Algona, North	Renfrew	Jas. Reeves, Eganville	18	1957	3	147		1
do South			1	200	1	100		9
Brougham			4	405			3	3
Grattan			4	371	1	4	1	6
Hagarty			24	3114	3	119	8	7
Richards			2	110	1	10		1
Wilberforce			1	100	1	25	2	7
Brudenell	Renfrew	Jno. Whelan, Brudenell	3	477			9	2
Griffith								
Lyndock								1
Matawatchan			2	190			2	1
Radcliffe			1	100	1	56	2	
Raglan			4	458			9	3
Sebastopol			4	371			3	5
Sherwood			11	1582			1	3
Alice	Renfrew	J. D. Kennedy, Pembroke	7	711	2	118	5	6
Buchanan			6	728			10	3
Fraser			3	301				1
Head			1	100				
Maria								
McKay								
Petewawa			7	665	2	79	6	5
Rolph			5	631	1	1	3	1
Wylie			2	400			4	1
Cameron			1	82				1

Bonfield	Nipissing	B. J. Gilligan, Mattawa	5	443		3	10
Calvin			5	800	3	6	5
Ferris			17	2391		11	1
Mattawan			1	200		4	1
Papineau			8	900		10	
Korah	Algoma	C. P. Brown, Sault Ste. Marie	2	320		2	
Parke						2	
Prince			4	640		4	1
Plummer	Algoma	J. F. Day, Bruce Mines	2	320		1	1
St. Joseph's Island	Algoma	Geo. Hamilton, Richard's Landing	7	782	2	44	19	13
Crooks	Thunder Bay	J. H. Ruttan, Port Arthur						
Dawson Road								
Oliver							1	7
Crozier	Rainy River							
Devlin								
Barwick								
Roseberry								
Nelles								
Blue								
Curran								
Aylesworth			7	959	1	98		6
Atwood			3	440	3	184		5
McIrvine			1	120	1	14		2
Worthington			1	160	1	77		2
Lash			3	481	1	60		4
Patullo								
Roddick			3	425				2
Morley			3	474				2
Woodyatt			3	551				3
Dilke			2	250				
Tait								
Shenston								
Totals			610	83273	53	2345	515	456

JOSEPH J. MURPHY,
Clerk in Charge.

AUBREY WHITE,
Assistant-Commissioner.

DEPARTMENT OF CROWN LANDS,
TORONTO, December 31st, 1890.

APPENDIX No. 10.

FISHERY OVERSEERS,

UNDER THE ONTARIO FISHERIES ACT.

NAME.	DISTRICT.	POST OFFICE ADDRESS.	SALARY.
Newton Flanagan	River Nepigon, Lake Nepigon and adjacent waters (resigned)	Red Rock	$50 00
John H. Willmott	District of Muskoka	Beaumaris	50 00
Francis James Moore	Counties of Victoria and Peterborough and Provisional Co. of Haliburton	Lakefield	50 00
Norman Clark	County of Lanark and all those parts of Frontenac and Addington yi north of the southerly limits of the Townships of Bedford, Hinchinbrooke and Sheffield	Mississippi Station	50 00
John T. Little	District bounded on the west by the east limit of the Garden Riv Indian Reserve produced north from the north-east angle thereof, and on the east by the east limit of the Township of Long produced north	Iron Bridge	50 00
Samuel R. McKewen	Manitoulin Island	Tehkummah	50 00
Benjamin McDermott	District of Parry Sound	Sundridge	50 00
Robert R. Smith	County of Renfrew	Eganville	50 00
William McKirdy	River Nepigon, Lake Nepigon and adjacent waters	Nepigon	50 00
Joseph Whalen	Thunder Bay District	Port Arthur	
John Emmons	Rainy River District	Rat Portage	

A. KIRKWOOD,
Chief Clerk in Charge.

AUBREY WHITE,
Assistant Commissioner.

DEPARTMENT OF CROWN LANDS,
TORONTO, 31st December, 1890.

APPENDIX No. 11.

STATEMENT of the number of letters received and mailed by the Department in 1888, 1889 and 1890.

YEARS.	Sales and Free Grants.	Accounts.	Surveys.	Woods and Forests.	Colonization Roads.	Transferred to other Departments.	Totals.	Names Indexed.	Enclosures.	Orders in Council.	Returned letters not called for at address.	Mailed from Department.
1888.....	7,548	1,010	2,248	3,160	2,373	10	16,379	23,000	33,000	21	12	18,272
1889.....	6,757	926	2,600	3,621	2,353	8	16,257	23,000	33,000	20	27	20,135
1890.....	6,954	1,444	2,486	4,272	2,679	12	17,837	24,000	34,000	24	25	21,022

CHARLES S. JONES,
Registrar.

AUBREY WHITE,
Assistant Commissioner.

December 31st, 1890.

APPENDIX No. 12.

STATEMENT of Municipal surveys for which instructions were issued during the year 1890.

No.	Name of Surveyor.	No.	Date of Instructions.	Description of Survey.	Date when Confirmed.
1	J. M. O. Cromwell	570	26th November, 1890...	To survey the allowance for road lying north of lot 35 in Concession No. 1 Rideau Front, and south of lots 26 to 30 inclusive in Concession No. 2 Ottawa Front, of the Township of Nepean and to plant durable monuments in such positions as will show said allowance for road	.....

GEORGE B. KIRKPATRICK, P.L.S.,
Chief Clerk in Charge.

AUBREY WHITE,
Assistant Commissioner.

DEPARTMENT OF CROWN LANDS,
TORONTO, 31st December, 1890.

APPENDIX No. 13.

STATEMENT of Municipal Surveys confirmed during the year 1890.

No.	Name of Surveyor.	No.	Date of Instructions.	Description of Survey.	Date when Confirmed.
1	David S. Campbell	556	November 8th, 1888....	To survey the side road allowance between lots 5 and 6 in the 10th Concession of the Township of Downie and to plant stone or iron boundaries	January 24th, 1890.
2	R. O. D. Kennedy	511	January 25th, 1883.....	To survey that part of the line between the 3rd and 4th Concessions of the Township of Wainfleet extending from the Township line between the Township of Humberstone and Wainfleet, west as far as lot 17, and to plant stone or other durable monuments.....	February 6th, 1890.
3	John Stewart	569	November 19th, 1889 .	To survey that part of the line between the 4th and 5th Concessions in the Rideau Front of the Township of Nepean, opposite lots 1 to 10 inclusive, and also part of the line between the 2nd and 3rd Concessions in the said Rideau Front, opposite lots 21 to 35 inclusive, and to plant permanent stone or iron monuments to show the true location of the allowance for road between the Concessions and opposite the lots above-named.....	February 14th, 1890.
4	J. G. Sing....	552	July 25th, 1888.....	To survey the blind line between the 5th and 6th Concessions of the Township of St. Vincent from the side road between lots 6 and 7 to the side road between lots 12 and 13, and to plant stone or other durable monuments at the rear angles of the lots in each Concession abutting on said part of said blind line	March 17th, 1890.
5	F. F. Pa smore	558	April 27th, 1889	To survey lots 14 and 15 in the 4th Concession of the Township of Barton, and to plant durable monuments at the north-west angle of lot 14 and at the north-east angle of lot 15 in said 4th Concession....	May 2nd, 1890.....
6	Geo. Ross	564	October 7th, 1889	To survey the road allowance between lots 11 and 12 in the 2nd Concession of the Township of Pelham, and to plant durable monuments at the north-west and south-west angles of said lot 11 and at the north-east and south-east angles of said lot 12.....	May 7th, 1890.....

7	J. H. Jones	402	August 26th, 1875	To survey and plant durable monuments at the front angles of the lots on the different Concessions in the Township of Sombra, excepting that portion covered by instructions dated 31st October, 1874, already confirmed and excepting the planting of monuments at the angles of lots along the road between the 13th and 14th Concessions, from side line between lots 19 and 20 to the east boundary of the Township, saving and excepting part of Concession line 7 and 8 from lot 1 to lot 10 inclusive	May 8th, 1890.
8	Edward Gardiner..... .	541	September 21st, 1886...	To survey the town line between the Townships of Pelham and Clinton and to plant stone monuments at the ends of each Concession line in the said Township abutting thereon.....	May 16th, 1890.
9	Joseph De Gurse	537	May 14th, 1886	To survey lots 19, 20 and 21 in the 10th Concession of the Township of Enniskillen, and to plant durable monuments at the front and rear angles of said lots.....	October 16th, 1890.
10	Richard Coad	557	December 3rd, 1888 ...	To survey the road allowance or line in rear of the front Concession lots in the Township of Plympton from the town line between Plympton and Sarnia, to the town line between Plympton and Bosanquet and to mark the same by stone or iron monuments	October 17th, 1890.

GEORGE B. KIRKPATRICK, P.L.S,
Chief Clerk in Charge.

AUBREY WHITE,
Assistant Commissioner.

Department of Crown Lands,
Toronto, 31st December, 1890.

APPENDIX No. 14.

STATEMENT of Crown Lands surveys in progress and amounts advanced up to date, during the year 1890.

No.	Date of Instructions.	Name of Surveyor.	Description of Survey.	Amount advanced.
				$ c.
1	June 18th, 1890	J. W. Fitzgerald	Township of Guthrie	3,870 00
2	June 18th, 1890	H. B. Proudfoot	" Barron	3,000 00
3	June 24th, 1890	Frank Purvis	" Hawley	1,500 00
4	August 6th, 1890	Francis Bolger	" Lyman	1,300 00
5	July 3rd, 1890	Alex. Niven	Line between the Districts of Rainy River and Thunder Bay	4,800 00
6	October 21st, 1890	C. F. Aylsworth, Jun.	Lots 30, 31 and 32 in the several Concessions in the Township of Madoc	100 00
7	June 21st, 1890	Edmund Seager	Timber Berths in the District of Rainy River	300 00
8	June 24th, 1890	Hy. DeQ. Sewell	" " Thunder Bay	850 00
9	October 24th, 1890	T. J. Patten	" 120, 125, 132, on North Shore of Lake Huron	200 00
10	October 3rd, 1890	James Dickson	Inspection of Surveys, 1890	1,200 00
			December 29th, 1890, the Copp, Clark Co., Maps of Nipissing District	250 00
				$17,370 00

GEORGE B. KIRKPATRICK, P.L.S.,
Chief Clerk in Charge.

AUBREY WHITE,
Assistant Commissioner.

DEPARTMENT OF CROWN LANDS,
TORONTO, 31st December, 1890.

APPENDIX NO. 15.

STATEMENT of Crown Land Surveys completed and closed during the year 1890.

No.	Date of Instructions.	Name of Surveyor.	Description of Survey.	Amount paid.	No. of acres.
1	31st May, 1887	Joseph DeGurse	Township of Garson	$130 31	22,933
2	29th May, 1888	Isaac L. Bowman	" Hess	339 65	21,995
3	29th May, 1888	Joseph DeGurse	" Craig	212 59	23,037
4	31st May, 1889	J. W. Fitzgerald	" Niven	597 64	54,252
5	11th June, 1889	E. J. Rainboth	" Marquis	125 69	22,867
6	11th June, 1889	Jas. S. Laird	" Pacaud	116 30	23,090
7	11th June, 1889	Henry DeQ. Sewell	" Scoble	183 69	19,767
8	8th August, 1889	B. J. Saunders	" Robillard	13 99	23,057
9	29th May, 1885	M. J. Butler	Re-survey of Kennebec	718 81	.....
10	26th October, 1889	J. F. Whitson	Timber limits in Rainy River District	7,086 14	.....
11	18th January, 1890	Edmund Seager			
12	17th October, 1889	James Dickson			
13	18th June, 1890	Lewis Bolton	Inspection of surveys, 1889	364 71	.....
14	18th June, 1890	Willis Chipman	Township of Shakespeare	1,610 28	23,004
15	18th June, 1890	Joseph M. Tiernan	" Lockhart	1,606 29	22,947
16	18th June, 1890	J. K. McLean	" Totten	1,597 40	22,820
17	24th June, 1890	W. R. Burke	" Charlton	1,639 75	23,425
18	24th June, 1890	E. J. Rainboth	" Garrow	1,612 87	23,041
19	25th June, 1890	Elihu Stewart	" Cleland	1,618 75	23,125
20	25th June, 1890	John McAree	" Appelby	1,952 86	27,898
21	25th June, 1890	T. B Speight	" Sharpe	1,607 48	22,964
22	7th August, 1890	Isaac L. Bowman	" Blain	1,600 48	22,864
23	18th June, 1890	David Beatty	" Gladman	1,626 94	23,242
24	18th December, 1889	T. J. Patten	Outline of Timber Berths 82, 83, 90, 91, north shore of Lake Huron	1,257 77	.....
25	11th January, 1890	T. J. Patten	North and east boundaries of Timber Berth 188, north shore of Lake Huron	408 60	.....
26	8th July, 1889	G. B. Kirkpatrick	North boundary of the township of McGiverin	193 80	.....
27		James Dickson	Commissioner at Rat Portage	250 00	.....
			" attending Kennebec Council *re* re-survey	30 00	.....
			February 10th, 1890. Samuel Bray, Maps of Indian Reserves	195 00	.....
			March 28th, 1890, F. L. Foster, copying maps, etc	51 69	.....
			May 5th, 1890, Drs. MacMurchy and Frazer, attending Geo. Smith	50 00	.....
			June 25th, 1890, Jas. Foster, micrometer telescope	77 00	.....
			October 30th, 1890, Map and School Supply Co., mounting maps	133 20	.....
			December 10th, 1890, Russell & Co., maps	24 00	.....
			" 18th, 1890, A. Aronsberg & Co., mathematical instruments	20 85	.....
			" 23rd, 1890, Unwin, Foster & Proudfoot, copies of plans	8 00	.....
			" 29th, 1890, Williamson & Co., Atlas of Ontario	6 00	.....
			Copp, Clark & Co., maps	974 75	.....
				$30,043 28	446,328

GEORGE B. KIRKPATRICK, P.L.S., Chief Clerk in Charge.

AUBREY WHITE, Assistant Commissioner.

DEPARTMENT OF CROWN LANDS, TORONTO, 31st December, 1890.

APPENDIX No. 16.

STATEMENT of Lands which have been patented in Unsurveyed Territory in the District of Rainy River during the year 1890.

No.	No. of Description.	Patentee.	Designation of Land.	Acres.	Amount.	Date of Patent.
					$	
1	R.R. 30	Graham, Horne & Co.	Mining Location, 114E Vermillion Bay, Eagle Lake	64	128	13th January, 1890.
2	" 31	Benjamin E. Chaffey	" " F22 in Bigstone Bay	88	176	17th January, 1890.
3	" 32	George Miller	" " Old Fort Island, Winnipeg River	74	148	18th January, 1890.
4	" 33	James Robertson	Part of Mining Location, K8 in the Township of Rat Portage.	45	90	28th January, 1890.
5	" 34	Chas. W. Chadwick	" " 121P south of Rat Portage	52	104	6th February, 1890.
6	" 35	Ross, Hall & Brown	N.-W. part of " 121P " "	22	44	3rd February, 1890.
7	" 36	Arthur Woods	Mining Location, A18 north of Lake Laurence	98	196	17th February, 1890.
8	" 37	Thos. A. Gorham	" " 213P near Pine Portage Bay, Lake of the Woods	83	166	4th March, 1890.
9	" 38	Chas. Laverdiere	" " 18 in the Township of Rat Portage	51	102	7th March, 1890.
10	" 39	John Evans	" " 260P east of Rat Portage	160	320	12th March, 1890.
11	" 40	C. S. Morris & H. DeQ. Sewell	" " 247P near Pine Portage Bay, Lake of the Woods	162	324	12th March, 1890.
12	" 41	S. S. Scovil	" " 288P east of Rat Portage	80	160	27th March, 1890.
13	" 42	S. S. Scovil	" " 283P, 285P east of Rat Portage	155	310	27th March, 1890.
14	" 43	S. S. Scovil	Addition to Mining Location, 283P east of Rat Portage.	14	28	28th March, 1890.
15	" 44	William W. Baby	Mining Location, 75P east of Little Wabigoon River.	151	302	2nd April, 1890.
16	" 45	The Bank of Ottawa	Bulwer's Mill Location at Norman, Lake of the Woods	35	350	19th April, 1890.
17	" 46	James Lobb	Mining Location (pt. of) 121P, south of Rat Portage	48	96	7th May, 1890.
18	" 47	Joseph D. Johnson	" " A16 in the municipality of Rat Portage	40	80	7th May, 1890.
19	" 48	W. E. Richardson and F. A. Day	" Locations, 8x, 9x, 10x, on Hunter's Island	220	440	5th May, 1890.
20	" 49	W. E. Richardson and F. A. Day	" " 11x, 14x "	162	324	5th May, 1890.
21	" 50	W. E. Richardson and F. A. Day	" Location, 12x "	161	322	6th May, 1890.
22	" 51	W. E. Richardson and F. A. Day	" " 13x "	173	346	6th May, 1890.
23	" 52	W. E. Richardson and F. A. Day	" " 15x "	186	372	6th May, 1890.
24	" 53	W. E. Richardson and F. A. Day	" Locations, 16x, 17x "	148	296	6th May, 1890.
25	" 54	W. E. Richardson and F. A. Day	" Location, 18x "	105	210	6th May, 1890.
26	" 55	W. E. Richardson and F. A. Day	" Locations 19x, 20x, 21x "	322	644	6th May, 1890.
27	" 56	W. E. Richardson and F. A. Day	" Location, 22x "	147	294	6th May, 1890.
28	" 57	W. E. Richardson and F. A. Day	" " 23x "	75	150	6th May, 1890.
29	" 58	W. E. Richardson and F. A. Day	" Locations, 24x, 25x "	134	268	7th May, 1890.
30	" 59	W. E. Richardson and F. A. Day	" " 26x, 27x "	170	340	7th May, 1890.
31	" 60	Oscar Lundberg	" Location, 304P, N.-E. of Indian Reserve, 38B, Lake of the Woods	80	160	9th May, 1890.
32	" 61	James Robinson	" " 12, east of Pine Portage, Lake of the Woods	80	160	19th May, 1890.
33	" 62	Eusebe Desmarais	" " 233P south side of Mink Bay, Keewatin	55	110	20th May, 1890.

31	R.R.	63	Keewatin Lumber & Manufacturing Co.	"	"	203P between C.P.R. right of way and Winnipeg River, Keewatin	2½	25	20th May, 1890.
35	"	64	D. H. Beaton	"	"	204P between C.P.R. right of way and Winnipeg River, Keewatin	1	10	28th May, 1890.
36	"	65	D. H. Beaton	"	"	Beaton's Island, Winnipeg Bay, Keewatin	12	24	28th May, 1890.
37	"	66	Thomas Sellars	"	"	205P between C.P.R. right of way and Winnipeg River	½	10	29th May, 1890.
38	"	67	Edwin Newell	"	"	A30 between C.P.R. right of way and Winnipeg River	4	25	29th May, 1890.
39	"	68	Kate Cole	"	Locations, A25, A26, two islands in Darlington Bay, Keewatin		30	60	28th May, 1890.
40	"	69	Peter Robertson	"	Location, K116 Darlington Bay, Keewatin		24	48	3rd June, 1890.
41	"	70	Cosford C. Forneri	"	"	289P on north side of C.P.R. east of Rat Portage	79	158	2nd June, 1890.
42	"	71	Peter Campbell	"	"	206P on north side of C.P.R. Keewatin	0 19-100	10	4th June, 1890.
43	"	72	Charles Mullin	"	"	58 north of C.P.R. Keewatin	½	10	10th June, 1890.
44	"	73	Charles Cole	"	Locations, A19 and 68 north of C.P. R. Keewatin		3 18-100	20	21st June, 1890.
45	"	74	William Young	"	Location 223P east of Pine Portage Bay, Lake of the Woods		73	146	2nd July, 1890.
46	"	75	James Pearson	"	"	X32 near Lake of the Woods	80	160	22nd July, 1890.
47	"	76	Robert Evans	"	"	202P on Winnipeg Bay, Keewatin	58-100	10	26th July, 1890.
48	"	77	Henry Burton	"	"	K85 Cameron Bay, Lake of the Woods	28	56	1st August, 1890.
49	"	78	Henry Burton	"	"	K86 " "	65	130	1st August, 1890.
50	"	79	Edward Peltier	"	"	K83 Winnipeg Bay, Keewatin	23	46	1st August, 1890.
51	"	80	Harold H. Wiley	"	Locations, R403, R404, 212x Atikokan River		242	484	1st September, 1890.
52	"	81	S. S. Scovil	"	Location, 284P east of Rat Portage		80	160	3rd September, 1890.
53	"	82	S. S. Scovil	"	"	292P " "	89	178	3rd September, 1890.
54	"	83	J. E. McKinnon *et al*	"	"	110 Wabigoon Lake	147	294	1st October, 1890.
55	"	84	John F. Caldwell	"	"	317P east of Rat Portage	131	262	16th October, 1890.
56	"	85	Harold A. Wiley	"	Locations, R400, R401, R402, Atikokan River		247	494	8th October, 1890.
57	"	86	John S. Whiting	"	"	308P Zigzag Point, Ptarmigan Bay	37	74	3rd November, 1890.
58	"	87	Harold A. Wiley	"	"	238x Atikokan River	29	58	11th November, 1890.
59	"	88	Harold A. Wiley	"	Locations 138x, 139x, 140x, Atikokan River		371	742	13th November, 1890.
60	"	89	Francis B. McManus	"	Location, K135 River la Seine		71	142	21st November, 1890.
61	"	90	Louis S. Franklin	"	Locations, 215x, 216x, 217x, 218x on Rainy Lake		926	1852	4th December, 1890.
62	"	91	Louis S. Franklin	"	"	213x, 214x on Rainy Lake	470	940	4th December, 1890.
63	"	92	E. Newell *et al*	"	Location, X110 in the municipality of Rat Portage		25	50	15th December, 1890.
64	"	93	W. H. Laird and C. S. Wiley	"	"	219x north of la Seine River	76	152	18th December, 1890.
65	"	94	Edwd. Vancourtland Wright	"	"	48P Lake of the Woods	139	278	18th December, 1890
66	"	95	Henry Sparks Pickands	"	"	K139 Steep Rock Lake	203	406	19th December, 1890.
67	"	96	Henry Sparks Pickands	"	"	K137 "	95	190	19th December, 1890.
68	"	87	Henry Sparks Pickands	"	"	K138 "	201	402	18th December, 1890.
69	"	98	Henry Sparks Pickands	"	"	K136 "	200	400	18th December, 1890.
							7845 45-100	$16066	

GEORGE B. KIRKPATRICK, P.L.S., Chief Clerk in Charge.
DEPARTMENT OF CROWN LANDS,
TORONTO, 31st December, 1890

AUBREY WHITE,
Assistant Commissioner.

APPENDIX 17.

Statement of Mineral Lands which have been patented in unsurveyed Territory in the districts of Thunder Bay, Algoma and Nipissing, during the year 1890.

No.	No. of Description.	Patentee.	Designation of Mining Tract.	Acres.	Amount.	Date of Patent.
					$	
1	2484	James Hitchcock *et al*	The Hitchcock Location near Portlock Harbor	34	68	8th January, 1890.
2	2490	Benton Murphin	Mining Location, R 395, north-west of Whitefish Lake	93	186	27th January, 1890.
3	2504	C. Haynes and G. E. Debernardi	" " 28E, south of the Township of Lybster	80	160	14th February, 1890.
4	2515	Alfred Russell	" Locations, R 427, R 428, R 429 west of the Township of Strange	240	480	11th March, 1890.
5	2528	William C. Caldwell	" " R 205, R 206, north-west of Gunflint Lake	143	286	31st March, 1890.
6	2538	A. M. Eastman, M.D.	" " R 370, R 371, R 372, north-west of Arrow Lake	225	450	9th May, 1890.
7	2539	A. M. Eastman, M.D.	" " R 378, R 379, on Lake Addie north-west of Arrow Lake	188	376	9th May, 1890.
8	2540	W. Colvill, J. A. Robb *et al*	" Location, 111x, west of Whitefish Lake	80	160	12th May, 1890.
9	2541	Thos. H. Shepherd, D. McLaren, *et al.*	" " F 4, east of Wahnapitae Lake	76	152	10th May, 1890.
10	2542	W. Colvill, J. A. Robb *et al*	" " R 302, north of Arrow Lake	81	162	10th May, 1890.
11	2543	W. Colvill, J. A. Robb *et al*	" " R 397, north of Arrow Lake	80	160	10th May, 1890.
12	2560	Eliza Noble	" " XIP, being west-end of Aird Island, and islands A, B, C, D, E	60	120	2nd June, 1890.
13	2571	A. M. Dodge	" Locations, F 5, F 6, south-west of Wahnapitae Lake	73	146	2nd July, 1890.
14	2599	Frederick Crompton	" " R 407, R 408, west of the Township of Strange	201	402	1st September, 1890.
15	2600	George A. Shaw *et al*	" Location, R 218, north-west of Whitefish Lake	80	160	1st September, 1890.
16	2601	G. Stevens and W. C. Stevens	" " 121E, on Mazakama Bay, Lake Superior	72	144	1st September, 1890.
17	2602	G. Stevens and W. C. Stevens	" " 122E, Neepigon River	80	160	1st September, 1890.
18	2603	G. Stevens and W. C. Stevens	" " 124E, west side of Neepigon River	80	160	1st September, 1890.

19	2618	George A. Shaw *et al*	"	"	R 309, west of the Township of Strange	65	130	1st October, 1890.
20	2625	W. H. Hunter *et al*	"	"	R 294, west of the Township of Strange	59	118	31st October, 1890.
21	2627	Thomas H. Thomas	"	"	WR 4, north of the Township of Dryden	40	80	23rd October, 1890.
22	2628	D. McLaren and F. Bouchier	"	"	WR 3, north of the Township of Awrey	40	80	23rd October, 1890.
23	2629	D. McLaren and F. Bouchier	"	"	M 3, on Bouchier Lake, E. of Wahnapitae Lake	21	48	October, 1890.
24	2639	J. K. Leslie and G. S. Macdonald	"	Locations,	WD 1, and WD 4, west of Wahnapitae Lake	74	148	25th October, 1890.
25	2642	G. Smith, W. B. Poulton *et al*	"	Location,	McA 1, Rabbit Lake, east of Wahnapitae Lake	50	100	31st October, 1890.
26	2643	James W. McIntosh	"	Locations,	76E, 77E, 79E, 83E, south of Whitefish Lake; 130E, 202E, south of the Township of Lybster	485	970	31st October, 1890.
27	2644	James W. McIntosh	"	Location,	R 172, south-east of Whitefish Lake	80	160	31st October, 1890.
28	2645	James W. McIntosh	"	"	82E, south of the Township of Strange	269	538	31st October, 1890.
29	2646	James W. McIntosh	"	Locations,	11T, 12T, on Sand River, Arrow Lake	155	310	31st October, 1890.
30	2647	James W. McIntosh	"	Location,	193T, south-east of Whitefish Lake	80	160	3rd November, 1890.
31	2648	J. E. Thompson *et al*	"	"	R 298, west of the Township of Strange	114	228	31st October, 1890.
32	2649	G. A. Shaw and W. H. Hunter	"	"	R 299, west of the Township of Strange	112	224	31st October, 1890.
33	2669	A. W. Godson	"	"	222X, west of the Township of Pardee	80	160	21st November, 1890.
34	2680	E. J. Jarvis and W. J. Skynner	"	"	WR 2, west of Wahnapitae Lake	80	160	1st December, 1890.
35	2681	R. McConnell and A. Gordon	"	"	W 4, west of Wahnapitae Lake	75	150	1st December, 1890.
36	2682	H. L. Higginson and O. S. Shepherd	"	Locations,	47E, 70E, 73E, 84E, 85E, north of the Township of McIntyre	720	1440	4th December, 1890.
37	2693	Samson Parker	"	Location,	112X, south of Whitefish Lake	160	320	15th December, 1890.
38	2696	William C. Caldwell	"	Locations,	207W, 208W, 209W, 210W, N. of Gunflint Lake	1210	2420	18th December, 1890.
39	2703	J. P. Donnelly and T. Marquis	"	Location,	203E, east of Schrieber Station	37	74	30th December, 1890.
						5975	$11950	

GEORGE B. KIRKPATRICK, P.L.S., Chief Clerk in Charge.
DEPARTMENT OF CROWN LANDS.
TORONTO, December 31st, 1890,

AUBREY WHITE,
Assistant Commissioner.

APPENDIX No. 18.

STATEMENT of Patents issued by the Patents Branch during the year 1890.

	Number.
Crown Lands	262
School "	80
Mining "	222
Public " (late Clergy Reserve)	32
Free grants lands, A. A	129
" " " under Act of 1880	287
Rainy River "	88
Licenses of occupation	2
Leases	2
Total	1,104

JNO. M. GRANT,
Chief Clerk in Charge.

AUBREY WHITE,
Assistant Commissioner.

DEPARTMENT OF CROWN LANDS,
TORONTO, 31st December, 1890.

APPENDIX No. 19.

STATEMENT of the names of Candidates who have passed their Examinations before the Board of Examiners of Land Surveyors for Ontario during the year 1890.

PRELIMINARY CANDIDATES PASSED.

Joseph Henry Grenfell.
Victor Hill.
Malcolm Cameron Macfarlane.
William Innes Mackenzie.
John Vicar Munro.

FINAL CANDIDATES PASSED AND SWORN IN AS PROVINCIAL LAND SURVEYORS.

David Burns, Graduate School of Practical Science.
James Gibbons, Graduate School of Practical Science.
Louis Valentine Rorke.
Ruyter Stinson Sherman.
Lewis Frederick Stephens.
Abel Seneca Weekes.
Albert Dyke Griffin.
Robert McDowall, Graduate School of Practical Science.
Joseph Edmund Ross, Graduate School of Practical Science.

The Board of Examiners of Land Surveyors, for Ontario, meets at the office of the Commissioner of Crown Lands, on the first Monday in each of the months of April and November, in every year, unless Monday be a holiday (in which case they shall meet on the day next thereafter, not being a holiday). Section 6, Chapter 152, Revised Statutes of Ontario of 1887.

PRELIMINARY EXAMINATION.

All persons, with the exception of Graduates of the Royal Military College at Kingston, and of the Ontario School of Practical Science, before they can be apprenticed to a Provincial Land Surveyor, must pass a satisfactory examination before the Board of Examiners in the following subjects: Penmanship, Orthography, Fractions, Decimals, Square Root, Logarithms, Algebra (including Equations to the first degree), Euclid (first four books), Plane Trigonometry, the Rules for Spherical Trigonometry, Mensuration of Superficies, the use of Ruling Pen and Construction of Plain and Comparative Scales.

FINAL EXAMINATION.

Final Candidates, before obtaining a License to practice, undergo a strict and searching examination before the Board of Examiners in the following subjects, viz. : Geometry, including the first six books of Euclid (with the exception of the last thirteen propositions of the Fifth Book) ; Algebra, including Progressions, Plane and Spherical Trigonometry, Mensuration of Superficies ; Laying out and dividing up of Land ; Descriptions by metes and bounds for Deeds and other Documents ; the Use and Adjustment of Surveying and Levelling Instruments ; the laying out of Curves ; Practical Astronomy, including finding of time, latitude, longitude, Azimuth, Variation of the Compass, and drawing Meridian lines ; the Acts relating to the Survey of Lands in Ontario, the general Mining Act, the Registry Act (so far as it refers to Plans), the Municipal Act (so far as they relate to Roads, Survey and Drainage), the Ditches and Water Courses Act ; the Theory and Practice of Levelling ; the Principles of Evidence ; Drawing of Affidavits ; Taking of Field Notes and Preparing Plans ; the Rudiments of Geology and Mineralogy, and the Sufficiency of their Surveying Instruments.

AUBREY WHITE,
Assistant Commissioner.

GEORGE B. KIRKPATRICK, P.L.S.,
Chief Clerk in Charge.

Department of Crown Lands,
Toronto, December 31st, 1890.

(*Appendix No. 20.*)

DISTRICT OF ALGOMA.

Township of Shakespeare.

Listowel, Ontario,
December 13th, 1890.

Sir.—I have the honour to submit the following report of the survey of the township of Shakespeare, in the district of Algoma, surveyed under your instructions dated the 18th day of June, 1890.

I left Listowel on the second day of August last and proceeded to Wiarton by Grand Trunk Railway, thence by boat to Spanish River Mills, from that point I went up the Spanish River by tug-boat to Webbwood on the Canadian Pacific Railway, in the township of Hallam; from this point I easily found the south-east angle of the township of Shakespeare, my place of commencement. I first traced up the west boundary of the township of Baldwin, being the easterly boundary of Shakespeare to the post, marking the line between concessions one and two in said township. I found the distance to be only seventy-nine chains instead of eighty-one chains and ninety-five links, as stated in my instructions. From this stake I ran a line on a bearing of N. 89° 15′ W. astronomically, so as to make the first concession a depth of about eighty chains after the first two lots. I then ran due north from the post on the south boundary of Shakespeare, between lots numbers two and three on the sixth concession of the township of Hallam, until it intersected the line between concessions one and two that I had just run; from this point of intersection I ran due north, laying off the concessions of a depth of eighty chains, leaving the fractional depth in concession number six, and ran due west laying off the lots of a width of forty chains each, leaving the overplus in lots numbers eleven and twelve.

The soil in concessions one and two is of a sandy loam with clay subsoil. The balance of the township is more of a clay loam and in some places heavy clay. About thirty per cent. of the township will be good for agricultural purposes, and the township is accessible by a waggon road running northerly from Webbwood to the lumber camps further north.

I found several deposits of magnetic iron, the principle one was on lot number nine, concession number six, I do not think the deposit is very extensive, nor did I see any traces of other minerals worth mentioning.

High rocky ridges running east and west are quite numerous, chiefly gneiss; in many places they are from one hundred and fifty to two hundred and fifty feet in height, affording a pleasing view of the country lying to the south. The steep sides of the rocks are always on the south side of the ridges which slope gradually to the northward.

There are a few lakes in the township, but generally small with rocky shores, and good water. Birch Lake abounds with pike, whitefish and trout.

The township is well watered with small spring streams which are soft there being no limestone.

The Spanish River is the only stream of note in the township. This enters from the north about the centre of the township runs southerly about two miles and then easterly, leaving the township on lot number one, concession five. It is ten chains wide in some places, and in a few places over that amount. The stream is rapid, having a good fall; the water is good, but of a dark colour.

Most of the township is covered with valuable timber, chiefly pine, balsam, spruce, tamarac, cedar, birch and maple. The first named being the most abundant, and the others in the order given. A part of the south-east corner was burnt over a few years ago destroying all the timber thereon, also a part of the south-west corner, these portions being shown on the accompanying timber map.

There are a few settlers in the township. This year they produced about a thousand bushels of potatoes of very fine quality, some oats and hay. These products can be raised with profit, there being a good demand for supplies for lumber camps.

Game, such as bear moose and red deer are not very plentiful; partridge are quite numerous and a few ducks.

During the progress of the survey I used a Stadia wire for measuring distances across lakes, streams, etc., which I proved in some cases by trigonometrical calculation to be very correct.

I took observations of Polaris at four different points to verify my work. I was unable to observe for latitude owing to my transit meeting with a small accident, bending the vertical circle.

I assumed the south boundary of the township to be about latitude 46° 15′ north.

I have the honour to be, Sir,
Your obedient servant,

LEWIS BOLTON,
Provincial Land Surveyor.

The Honourable A. S. Hardy,
Commissioner of Crown Lands,
Toronto.

(*Appendix No. 21.*)

DISTRICT OF ALGOMA.

Township of Totten.

Tilbury Centre, Ontario,
November 11th, 1890.

Sir.—In accordance with instructions from your department bearing date the 18th day of June, 1890, I beg to report having made the survey of the township of Totten in the district of Algoma.

Leaving the Sault Ste. Marie branch of the Canadian Pacific Railway at Camp Forty in the township of Drury, I went up the Spanish River to the east boundary of the township of Hyman, and then packed north along said boundary to the south-east corner of the townshiy of Totten, where I commenced work by retracing the north boundary of the township of Hyman and the west boundary of the township of Trill for my south and east boundaries, and ran the concessions and side-lines west and north, setting posts as required by the instructions.

Owing to the prevalence of very rainy weather I had great difficulty in obtaining the necessary observations, and it was only after repeated failures that I did so. The magnetic variation is 4° 3′ west where not affected by local attraction, but throughout the north-eastern part, particularly the brulé, it is very uncertain and irregular.

The country is very rough. Rocky hills rise to a height of two hundred or three hundred feet, affording magnificent scenery. The township is well watered by numerous creeks and several deep, clear lakes of considerable size. There are two large creeks, one entering the township on lot number one in the sixth concession and draining the chain of lakes and leaving the township on lot number five in the first concession. The other enters the township from the north on lot number eleven and with an irregular course through the township, leaves it at the line between lots numbers eleven and twelve on the south boundary.

Along this creek is a belt of level land from one-half mile to one and one-half miles wide free from stone and well timbered with pitch pine, spruce and tamarac. The balance of the township, except the brulé in the north-east corner, (see timber plan) of which there is about three thousand five-hundred acres, is well timbered with white pine of good quality, birch, spruce, cedar, maple, etc. The pine is fairly abundant, more particularly on lots numbers five and six in the third concession, and lots numbers seven and eight in the fourth and fifth concessions.

Either of the creeks could easily be fitted up for driving logs.

The lakes are well stocked with fish, and there is an abundance of game, consisting of moose, bear, deer, duck, partridge, etc.

Where not too rocky the soil seems to be fairly well adapted for agricultural purposes, being generally sandy loam with clay loam in a few places, and in the swamps a black alluvial soil overlying a sand subsoil.

The rock is of the Laurentian formation. There were no minerals of any commercial value met with on this survey. There are no settlers in any part of this township.

Accompanying this report you will find plans, field-notes, etc., of the township, which I trust you will find satisfactory.

I have the honour to be, Sir,
Your obedient servant,

JOSEPH M TIERNAN,
Provincial Land Surveyor.

The Honourable A. S. Hardy,
Commissioner of Crown Lands,
Toronto.

(*Appendix No. 22.*)

DISTRICT OF NIPISSING.

Township of Barron.

Toronto, Ontario,
December 19th, 1890.

Sir.—I have the honour to submit the following report of the survey of the township of Barron in the district of Nipissing, made under instructions from your department, dated the 18th day of June, 1890.

The township of Barron is bounded on the north by the township of Edgar, on the east by the townships of Bronson and Stratton, on the south by the township of Guthrie, and on the west by the townships of White and Niven, and is situated at the head waters of the south branch of the Petewawa River.

The north-western portion of this township is drained by the little Madawaska River, which flows into Lake Traverse on the north branch of the Petewawa River.

In surveying this township I began work at the south-west angle of the township of Bronson, and surveyed the east boundary of the township of Barron, producing the same south to the south-east angle of the said township; then surveyed the south boundary of said township to the intersection of the east boundary of the township of Niven, and then projected the concessions and side-lines westerly and northerly from the east and south boundaries respectively on the bearings given in the instructions, having taken frequent astronomical observations to determine the same.

With the exception of a few small patches of hardwood bush, shown on the timber plan, all the timber in the township has been burned at various times, a small portion lying along the west boundary being burned clean as recently as the spring of 1889.

The pine timber in this neighbourhood has been very good, but lumbering operations having been carried on here for so many years, all the large timber has been removed.

The general surface of the township compared with the surrounding country is level, with the exception of that portion lying between the waters of the Little Bonnechere River and the Grand Lake, which is exceedingly mountainous.

The soil is nearly all sand or sandy loam, with the exception of a small quantity of clay loam in one or two places.

No minerals of economic value were met with during the survey.

I have the honour to be, Sir,
Your obedient servant,
H. B. PROUDFOOT,
Provincial Land Surveyor.

Honourable A. S. HARDY,
Commissioner of Crown Lands,
Toronto.

(Appendix No 23.)

DISTRICT OF NIPISSING.

TOWNSHIP OF GUTHRIE.

PETERBORO', ONTARIO,
December 1st, 1890.

SIR.—I have the honour to submit herewith the field-notes and plan of survey of the township of Guthrie in the district of Nipissing, performed under your instructions, dated the 18th day of June, 1890.

I commenced the survey as per instructions at the south-east corner of the township of Barron, by producing the east boundary on the astronomical bearing S. 20° 51′ 40″ E. to the north boundary of the township of Burns.

Conjointly with the survey of the boundary, I carried the side-lines between lots numbers five and six and ten and eleven from the north to the south boundary on the same bearing, also the several concession lines from the east boundary west to the side line between lots numbers fifteen and sixteen on the given astronomical course S. 69° 08′ 20″ W.

Concessions numbers one and two have an overplus in depth averaging sixty-four chains, ten links in the total length of the concessions, thus giving to each of them an average depth of 82.05 chains.

The north boundary of the township of Burns not extending to the south-west corner of the township of Guthrie, I produced the boundary to that point.

The easterly half of the township, though generally undulating, is in places lumpy and broken, exposing considerable rock and stone.

The soil is sandy, in places mixed with clay resting on rock, gravel or clay bottom.

Scattered over the slopes and valleys at many points is a fair average of arable land.

A few years ago this part of the township suffered from the ravages of a fire which swept over a large tract of country, extending for many miles.

Much of the old timber was destroyed and the country is now covered with a thick growth of small poplar, white birch, pitch pine, oak saplings, hazel, alder and willows.

Over the country there are scattered small swamps, swales and beaver meadows, now more or less dried up, excepting during the spring and freshet seasons.

The south-westerly quarter of the township is mainly high land overlooking the country for many miles round.

Though somewhat stony, this portion contains a large percentage of good land of which clay forms the chief part.

It is covered with a healthy growth of white pine, hemlock, birch, maple, beech, cedar and balsam. It is being lumbered this season by the Messrs. McLaughlin Bros., owners of the limits.

The north-west quarter, owing to the fire referred to, is now a brulé covered with the usual kinds of second growth mixed wood.

The country is rolling, and although somewhat broken and rocky in places, areas of fair land composed of sandy and clay loam are frequent.

The Bonnechere River enters the township on the west boundary concession number eleven, and flows through it in a general south-easterly direction, passing out at lot number twelve, concession number one.

At the time of surveying—August—the river proper varied in width from fifty to eighty links, having an average depth of perhaps twenty inches.

In spring and freshets the depth varies up to four feet or more where the banks confine it.

There are no openings of any extent in the river within the township.

The current for the greater part is strong and uniform, though short stretches of rapids are not infrequent; considerable improvements for the passage of saw-logs, etc., have been made on the river.

The extension of the Bonnechere road from the village of Eganville passes north-westerly through the west part of the township.

At the intersection of Basin Creek with the road on lot number fifteen, concession number three, is Basin Depot, largely used by the lumber company. A post office has been established there for some years. There are some ten good buildings, and probably about ten acres cleared and partially under crop (potatoes.)

The proportion of the township covered by water is comparatively small, nor are the lakes large.

They contain pike in abundance and other kinds of fish, it is said. Red deer and moose roam all over the country.

There are three settlers in the township. Patrick Garvey on lot number

fifteen, concession number two, is a settler of thirty-five years. He has a good one-and-a-half story house and suitable out-buildings; about twenty acres cleared and mostly in crop; a good team of horses, cattle, poultry, etc.

James McDonald on lot number fourteen, concession number one, has a good one story house with ample outbuildings; about fifteen acres cleared and under crop and pasturage. He has cattle and poultry, etc.

Denis McCue, on lot number twenty-three, concession number eight, has a good log house and suitable buildings; about ten acres under crop; a team of horses, cattle, pigs, poultry, etc.

The settlers have families and are doing quite comfortably.

On the whole, I would estimate the arable land in the township at about thirty per cent., while a large portion of the remainder is suitable for pasturage, etc.

I have the honour to be, Sir,
Your obedient servant,
J. W. FITZGERALD,
Provincial Land Surveyor.

The Honourable A. S. HARDY,
Commissioner of Crown Lands,
Toronto.

(*Appendix No. 24.*)

DISTRICT OF NIPISSING.

TOWNSHIP OF APPELBY.

COLLINGWOOD, ONTARIO,
December 8th, 1890.

SIR,—I have the honour in accordance with your instructions, dated June 25th, 1890, to submit the following report on the survey of the township of Appelby, in the district of Nipissing, and to forward herewith plans and field notes of the same.

As all the boundaries of this township had been previously surveyed, I retraced and adhered to them. No particular difficulty was found in doing this excepting in the case of the south boundary, which had been surveyed in 1857, or thirty-three years ago. Since that time the original forest has been destroyed by fires and the old line frequently entirely obliterated for considerable distances. I found, however, sufficient traces to enable me to re-establish it without any practical deviations.

The south branch of the Veuve River flows in an easterly direction across the township. It is a stream averaging about a chain and a half in width, and during the past season contained sufficient water to render it convenient for canoes. In a dry season it could not be relied on for that purpose, but it is very convenient for the lumbermen, as it is always sufficiently high in the spring to allow them to get their logs down. There is also a small tributary of this stream flowing into it from the north-western part of the township, which could probably be utilized for the same purpose.

The larger part of the township has been swept by fire destroying an immense quantity of good pine, and is now covered with small second growth of poplar, birch, willow and alder. The parts that have escaped its ravages lie

along the Veuve River, and a fair quantity of pine is found here which is now being cut by Messrs. Hay and Davidson, the owners of the limit. A small quantity of oak, soft maple, and ash is found growing along the banks of the Veuve River. No lakes were met with in the township, and consequently no water areas are shown on the map.

The land is rough and rocky north of the river, but rather flat on the south side, especially after passing west a mile or two from the east boundary. There are several belts of good clay and sandy loam in this part of the township, and I would estimate fifty per cent. of the whole township as fit for agricultural purposes.

I saw no traces of economic minerals.

The magnetic variation was from 6° to 6° 30′ west with occasional disturbances from local attraction.

I have the honour to be, Sir,
Your obedient servant,

E. STEWART,
Provincial Land Surveyor.

The Honourable A. S. HARDY,
Commissioner of Crown Lands,
Toronto.

Appendix No. 25).

DISTRICT OF NIPISSING.

TOWNSHIP OF BLAIN.

TORONTO, ONTARIO,
October 30th, 1890.

SIR,—I have the honour to submit the following report of the survey of the township of Blain, in the district of Nipissing, under the instructions of your Department, dated the 25th day of June, 1890.

The instructions as to the method of survey were observed throughout.

The north and north-west portions of the township are composed chiefly of clay soil of fair quality for agricultural purposes; the south-west part is sandy and rocky with small patches of arable land; the south-east quarter is principally rocky and rolling, the rocks in many places having been exposed by the action of recent fires. In all, about fifty per cent. of the area of the township may be considered fair agricultural land.

In concessions numbers three, four, five and six, the land is gently undulating or flat and was found to be very wet owing to the large rainfall this season. The remainder of the township is much drier by reason of its sandy soil and rolling surface.

The north branch of the Blanche River (also known as Blanche Creek) entering on lot number five, concession number six, and passing out on lot number one, concession number four, drains the north-east part of the township. This stream averages about seventy-five links in width, with a depth of four feet, its banks being from eight to ten feet in height and its current sluggish. The south branch of Blanche River drains the remainder of the township.

The lakes consist of an expansion of the south branch of the Blanche River, known as Kushog Lake, and a small marshy lake in lots numbers three and four, concession number three.

The greater portion of the north half of the township is timbered with tamarac, spruce, balsam, cedar, and poplar, the maximum diameter being twenty inches, but a very small proportion is of marketable size and quality. The balance of the area is covered with second growth tamarac, spruce, balsam, pitch pine and poplar, with dense growth of alders, the original timber having been destroyed by fire some twenty-five years ago.

Wild fruit of various kinds was abundant, particularly blue berries, raspberries, plum and cherries.

The usual game common to that district, viz.: moose, cariboo, bear, beaver etc., were seen.

No indications of minerals of any value were met with. Owing to the prevalence of cloudy and rainy weather, I only obtained two astronomical observations.

The average magnetic variation was 7° 46′ west. A general plan, timber plan field notes and accounts accompany this report.

I have the honour to be, Sir,
Your obedient servant,

T. B. SPEIGHT,
Provincial Land Surveyor.

The Honourable A. S. Hardy,
Commissioner of Crown Lands,
Toronto.

(*Appendix No. 26.*)

DISTRICT OF NIPISSING.

Township of Charlton.

Elora, Ontario,
November 29th, 1890.

Sir,—I have the honour to submit to you my report on the survey of the township of Charlton, in the district of Nipissing.

This township is situated north of the Indian Reserve, on the north shore of Lake Nipissing, and is bounded on the east by the township of Blyth, on the west by the township of Grant, and on the north by the newly surveyed township of Lyman.

I commenced the survey by retracing and renewing the north boundary of the Indian Reserve, from the south-west corner of the township of Blyth to the south-east corner of the township of Grant, planting the lot posts at the proper places, then running the different side lines north and the concession lines in the proper manner.

About one-half of this township has been burned over some years ago; the original timber having then been killed or destroyed, a thick growth of small poplar birch and spruce, with maple in a few places, covers the country.

The remainder is covered with spruce, balsam, birch, tamarac, a little maple and white pine. The latter is generally small and scrubby, being of very poor quality, except in the eastern portion of the township. On lots numbers one, two and three, in concessions two, three and four some very large white pine is met. The greater portion is from two feet to three feet six inches in diameter. A considerable portion of this large pine seems to be dying, and unless cut before long will become useless.

Portions of the lots over the whole township will make fair agricultural land, being of a rich sandy loam, although usually very stony. Owing, however, to its being easy of access to the Canadian Pacific Railway it should soon become valuable.

The township is drained by the waters of the Sturgeon River. A small stream called Smoky River runs westerly along the south boundary, with several small branches coming in from the north.

Tomiko River, a branch of the Sturgeon River, enters the township in lot number three, concession number six, running south-westerly, entering concession number five on lot number six, when it runs almost due west to lot number one, where turning south-westerly it leaves the township in concession number four.

This stream is of considerable size, but is very full of rapids and chutes.

I have the honour to be, Sir,
Your obedient servant,

J. K. McLEAN,
Provincial Land Surveyor.

The Honourable A. S. Hardy,
Commissioner of Crown Lands,
Toronto.

(*Appendix No. 27.*)

DISTRICT OF NIPISSING.

Township of Cleland.

Ottawa, Ontario,
November 20th, 1890.

Sir,—I have the honour to submit the following report of the survey of the township of Cleland, in the district of Nipissing, performed by me under instructions from your department, dated the 24th day of June, 1890, and to transmit you herewith the plans, field notes and account of the same.

I travelled from here with my party by the Canadian Pacific Railway to its crossing the Wahnapitae River, and by canoe down this river to Elbow Creek, and up this creek to Salter's base line, which forms the southern boundary of Cleland. I retraced and posted this boundary in accordance with your instructions, and surveyed and posted the other subdivision lines of the township, as shown on accompanying plan and field notes, which contain all the details of the survey.

About one-half of the township is suitable for agricultural purposes, the other half being hilly and rocky and should be rich in minerals, the rock formation being similar to that about Sudbury.

There has been a mining location surveyed in the northern part of the township, where I saw some fine deposits of white mica which had been stripped, and some blasting done.

This was done previous to my survey.

Where not hilly and rocky, the soil is a clay loam, the best land being situated towards the south-eastern corner and along the Wahnapitae River, which enters the township on lot number twelve, concession number three, and leaves it on lot number twelve, concession number two.

Elbow Creek and lakes run diagonally through the township and there is a good water power on this creek on lot number six, concession number one, where a dam has been built for driving or floating the timber down this stream by Messrs. "Emery Bros.," who lumbered extensively last season in this township; this season "The Georgian Bay Lumber Company" have two lumber camps in operation four or five miles south of Salter's base line and their portage or winter road from the Canadian Pacific Railway crosses this township as shown on plan, which also shows the road branching off from this one eastward, as used last winter by the firm of "Emery Bros."

There is a large quantity of valuable pine timber still uncut in this township which is covered also with a heavy growth of spruce, birch, tamarac, poplar, pitch pine and balsam.

A brulé extends across the north-west corner of the township, and continues northward to the railway.

Game, such as moose, red deer, and partridge were numerous and were met through the woods frequently on going to or returning from work.

I have the honour to be, Sir,
Your obedient servant,

E. J. RAINBOTH,
Provincial Land Surveyor.

The Honourable A. S. Hardy,
Commissioner of Crown Lands,
Toronto.

(*Appendix No. 28.*)

DISTRICT OF NIPISSING.

Township of Garrow.

Ingersoll, Ontario,
October 28th, 1890.

Sir,—I have the honour to submit the following report of my survey of the township of Garrow, in the district of Nipissing, according to your instructions, dated the 24th day of June, 1890.

I arrived at North Bay on the 25th day of August, and spent the next day in engaging the men necessary to complete my party and in purchasing supplies, and then proceeded by means of waggons up the Temiscamingue Road to near the south-west corner of the township.

After re-opening the southern boundary of the township, I moved my supplies along the boundary to the line between lots number six and seven, and from there surveyed the southern portion of the township. Having finished the work in that part, I moved north-easterly by canoes and portage to the river

Jocko, camping about a mile from the east boundary. From thence I was enabled to push the survey along the eastern side of the township, moving up the river as the work progressed, until the west boundary was reached. The large amount of portaging in the early part of the survey, together with the broken nature of the country, rendered the work on the whole somewhat difficult.

Where not over-run by fire the township is well timbered, the dry land supporting a fine growth of mixed timber comprising chiefly birch, maple, balsam and pine, while the low lands are thickly covered with spruce, tamarac, and cedar of medium size and fair quality. Considerable areas of both red and white pine were also passed through.

The land throughout the township is sandy and while the beautiful forests of maple and birch which clothe the dry undulating lands in the south-eastern portion of the township indicates a soil of great richness, yet the numerous swamps and rocky ridges render the unbroken area of such land of but limited extent. Still the amount suitable for farming should claim the attention of intending settlers.

The burned land in the north-west corner of the township which had once supported a magnificent forest of pine is comparatively level and quite free from stones and rocks, being covered with only a small growth of poplar and birch, it will be easily cleared and though somewhat sandy, may be found suitable for agriculture.

The Jocko, a stream averaging about one chain in width, enters the township at the west boundary in concession five and flowing across the township leaves it at the east boundary in concession two; it has a good current, its banks are clothed to the water's edge with deciduous and evergreen trees—which after the early frosts of autumn present many scenes of great beauty to the voyageur, as he follows its very circuitous and winding course.

There are about thirty lakes in the township, one in concession two nearly two miles long by about fifteen chains wide, another at the south-west corner the portion that is in the township extending about a mile easterly by about half a mile north; the others vary in size, some very small indeed.

Although, as a rule, the water is very clear and good, very few fish were found in the lakes.

Large game such as moose and bear were apparently very plentiful.

The lakes are all accurately surveyed and a good deal of time and pains was taken with them.

The half mile posts on concession lines are, as a rule, placed mid-way between the posts at the corners of the meridians.

I placed iron bars with wooden posts at the four corners of the township. The iron bars are three feet long and driven two feet into the ground, and the proper letters, etc., are cut on them with a cold chisel.

Throughout the township, with few exceptions, cedar posts were planted, and many times a cedar post was carried some distance so that the corners would be marked with a post that would not soon decay.

No economic minerals were met with.

I found no settlers in the township.

I have the honour to be, Sir,
Your obedient servant,

W. R. BURKE,
Provincial Land Surveyor.

The Honourable A. S. HARDY,
Commissioner of Crown Lands,
Toronto.

(*Appendix No. 29.*)

DISTRICT OF NIPISSING.

Township of Gladman.

Berlin, Ontario,
December 10th, 1890.

Sir.—In accordance with your instructions dated the 7th day of August last, I proceeded *en route* to Sturgeon Falls, where I bought all my supplies, and from thence with twelve men up the Sturgeon River, to the trail leading to Tomiko Lake. At Tomiko Lake we entered the Tomiko River, going up stream, encountering almost at every turn a chute, rapid, or fall. We left Sturgeon Falls on the 16th day of September, and arrived at the south boundary of Gladman about a week later, having passed as many as forty chutes on the way.

I first measured westerly along Provincial Land Surveyor Alexander Nivens' base line from the south-west angle of the Township of Hammel, brushing out the line and planting the posts at the proper points as I proceeded. I then projected the side lines as meridians to the north, and the concession lines east and west throughout the township, checking their courses at intervals by observations of Polaris. I found the variation of the magnetic needle to be 7° 30′ W.

Having observed Polaris, I ran the line between lots four and five north astronomically, from the south boundary two miles. I then ran concession line three east one mile, and west two miles, and from here I extended my line south and north. After observing Polaris on side lines six and seven, concession three, I extended my line north to Marten Lake. The south-western portion of the township was then completed by flying camp, the west boundary being extended northward four miles. We then moved camp from the lake on side line six and seven, concession line four to Marten Lake, from which camp we finished the township, completing it on the first day of November.

The traverse maps accompanying the field notes show the lakes traversed, some of which were done with the Rochon micrometer, and others by a system of triangles, all the angles having been carefully observed and measured as shown on the maps.

The distances across Marten Lake were obtained by a careful measurement of a base on a sand beach of said lake, from which base a system of triangles was built up, and the distances across the lake at each of the side lines between lots four and five and six and seven, thus carefully observed and calculated.

The township is thickly wooded throughout, having only one occasional strip of brulé, the longest of which does not cover over three-quarters of a square mile at the south-west corner of the township. The timber, as a rule, is not large, only a few large pine having been discovered at the north and east. Some extensive spruce and tamarac swamps traverse the township in a north-westerly direction. It is, however, essentially and peculiarly of a mixed nature, hard and soft woods being found intermingled almost without exception on all the elevated portions of the township, and on the shores of the lakes.

Judging from the pine seen on the shores of a large lake connected with Marten Lake by a small channel at its north-east end, the district to the north of Gladman contains considerable valuable timber.

This township I believe to be situated on the watershed of the Ottawa River and Lake Nipissing, the waters dividing near the centre; the northerly portion drains into the Ottawa River, while the southerly portion drains into Lake

Nipissing. Marten Lake, and the waters draining towards the Ottawa are full of the finest specimens of grey trout, and from the numerous traces of large and comparatively recent camp grounds found there, I judge it to have been, and to be still, the summer home of Indians, who go there to hunt and to fish.

The township is overrun with large and small game of all kinds, fresh traces of moose and red deer being apparent everywhere, and not a few of the animals themselves having been seen during the survey.

Large quartz veins were seen all over the township, and on the shores of a small lake were found some very fair specimens of white mica. The bed rock was, however, of a granite or gnessoid nature.

This township is unfit for agriculture, and although no very high elevations were noticed, it was found on the whole to be very rocky and undulating, the surface being covered with only about a foot of vegetable mould.

There were no squatters in the township.

I have the honour to be, Sir,
Your obedient servant,

ISAAC L. BOWMAN,
Provincial Land Surveyor.

The Honourable A. S. Hardy,
Commissioner of Crown Lands,
Toronto.

(*Appendix No. 30.*)

DISTRICT OF NIPISSING.

Township of Hawley.

Eganville, Ontario,
November 28th. 1890.

Sir.—In accordance with instructions from your Department, dated the 24th day of June, 1890, to survey the township of Hawley, in the district of Nipissing, into farm lots of three hundred and twenty acres each, I beg to report having done so, agreeably to said instructions.

I took my men and supplies *via* the Canadian Pacific Railway, to Warren Station, thence by canoes by way of the south branch of the Veuve River, to Lake Nepewasing. I found said lake to be a beautiful sheet of water, surrounded by high, rocky hills, clothed with red and white pine. The waters are clear and pure, and well stocked with bass, pike, and maskinonge.

The township is well watered throughout by small spring creeks, usually rising in some beaver meadow.

The surface of the township is very rough, broken and rocky, and therefore not very well adapted for agricultural purposes.

The rock formation is Laurentian, with scattered boulders of Huronian over its entire area. No economic minerals were found during the survey.

The timber in the unburnt portions consists of red and white pine, balsam, spruce, tamarac and birch. There is some very large pine in the north-west

corner, but the timber in the remainder of the township is of a very poor quality. The brulé portions are covered with a dense growth of small poplar, birch, tamarac, spruce and jack pine.

Game was abundant, principally deer, moose and bear.

This township comprises part of Messrs. Davidson and Hay's limit. Those gentlemen have constructed a wagon road from Markstay Station on the Canadian Pacific Railway to their depot, on lot number two, in concession four, and have produced same to one of their shanties on lot seven, concession four.

Herewith I enclose plans and field notes of the survey, which I trust will meet with your approval.

I have the honour to be, Sir,
Your obedient servant,

(Signed) FRANK PURVIS,
Provincial Land Surveyor.

The Honourable A. S. HARDY,
Commissioner of Crown Lands,
Toronto.

(*Appendix No. 31.*)

DISTRICT OF NIPISSING.

TOWNSHIP OF LOCKHART.

BROCKVILLE, ONTARIO,
November 24th, 1890.

SIR.—I have the honour to submit the following report on the township of Lockhart, in the district of Nipissing, surveyed this summer, in conformity with your instructions, dated the 18th day of June, 1890.

We proceeded by railway to North Bay, thence by the Government Road leading northerly towards Temiscaming to the south-west angle of the township, and commenced the survey by opening up and rechaining the north boundary of the township of Mulock, and posting this line as the front of the first concession of Lockhart.

The lines in front of concessions numbers two and five, and the side line between lots numbers four and five, and numbers eight and nine in part, were made bases from which the other lines were run.

The east boundary of the township was run due north from the south-east angle of the township to the front of the sixth concession, but the east boundary of this concession was run on a course N. 1°, 25′, 45″, E., to intersect the posts planted by Provincial Land Surveyor Alexander Niven, as the north-east angle of the township.

The magnetic variation at points of astronomic observation varied from 7° 05′, west, to 9° west.

The north-east portion of this township is drained by a small stream flowing into the north branch of the Jocko River.

The remaining portion of the township is drained by streams flowing into the south branch of the Jocko, which passes out of the township in the second concession, in lot number one. This stream has two branches which unite on lot

number one in the second concession. The southerly branch, which is much the larger, rises in the township of Mulock, entering the township of Lockhart at the south-west corner of lot number two. The other branch rises in the township of Stewart, entering the township of Lockhart at the north-west angle of the second concession, thence flowing north-easterly through a chain of small lakes to the front of lot number six in the sixth concession, thence south-easterly to the junction with the south branch. Both of these branches could be used for "driving" timber in high water.

The township of Lockhart has few hills of any great elevation, the most elevated portion of the township being probably the central part of concessions numbers one, two and three, which portion of the township is wooded with maple, birch and balsam, chiefly. In the other portions of the township we find spruce, tamarac, cedar, red pine, white pine and pitch pine, also a few ash, elm and iron-wood trees.

The soil throughout the township, unless otherwise given in the field notes, is a light sandy loam, generally stony.

There are few rock exposures in the township, those met with being Laurentian.

No economic minerals were met with.

There is no brulè in the township.

The timber limit line shown on the projected plan which accompanied the instructions, was retraced, and is shown upon the plans of the township.

The North Bay and Temiscaming Road affords easy access to this township, which is without a settler.

Accompanying this report are the field notes, plan of survey, timber plan, and other returns required.

I have the honour to be, Sir,
Your obedient servant,

WILLIS CHIPMAN,
Provincial Land Surveyor.

The Honourable A. S. Hardy,
Commissioner of Crown Lands,
Toronto.

(*Appendix No. 32.*)

DISTRICT OF NIPISSING.

Township of Lyman.

Penetanguishene, Ontario,
November 17th, 1890.

Sir.—I have the honour to submit the following report of the survey of the township of Lyman, in the district of Nipissing, under instructions bearing date, the 6th day of August, 1890.

I proceeded to my work by way of North Bay and Sturgeon Falls. Procuring canoes at the latter place, I followed up the Sturgeon River to the point where

the Tomiko River empties into it. Following the windings and turnings of this, the most tortuous of rivers, rendered by its numerous rapids and shallowness a most difficult stream to ascend in canoes, I arrived in due time at my starting point, a post planted by Provincial Land Surveyor Baird, at the south-west angle of the township of Notman.

I commenced my work by taking an observation of Polaris, preliminary to active operations. I then proceeded to ascertain the true astronomical bearing of a straight line connecting the south-west angle of the township of Notman with the post planted at the north-east angle of the township of Grant, this latter point being identical with my south-west angle. This line forming my south boundary deflected from a due east line at a distance of six miles, seventeen chains and fifty-three links to the south, thus making the bearing, S. 87° 55′ W. astronomical. In running my west boundary I had to proceed in a similar manner to that followed in running out my south boundary, viz., to ascertain the true astronomical bearing of a straight line joining the north-east angle of the township of Grant, with a post planted to the north by Provincial Land Surveyor Niven in 1881, and marked thus,

which, according to instructions, is identical with my north-west angle. The distance between the two points being four hundred and ninety-five chains and twenty-one links, and the deflection from a due north line two chains and eighty-eight links to the west, the bearing of my west boundary is therefore N. 0° 20′ E., astronomical.

The portion of the township lying south of the line between concessions numbers four and five is flat, with a gentle slope towards the south. This tract consists of fairly good land. Although swampy in places, there is a good outfall for drainage. Patches of excellent farming land, small in area, are found in the second and third concessions between the east boundary, and the line between lots numbers six and seven.

It will be seen by reference to the timber map that pine (principally white) is distributed over the greater part of the township. It is not, however, very abundant, being very much scattered, but the quality is good. The prevailing timber, naming it in the order of abundance, consists of spruce, tamarac, balsam, cedar, poplar, white and black birch, and maple.

The northerly part of the township is broken and hilly, with a light sandy soil. One-third of the township has been devastated by fire, the burnt district composing the westerly part of the township. All the timber has been killed, and a dense growth of poplar, cherry and birch has sprung up. Judging from the size of this second growth, the fire must have occurred about fifteen years ago. Over some portion of this brulè there has been some very large pine, as is evidenced by the dead trees still standing.

The Tomiko River is a stream of considerable size, having an average width of one and a half chains. It is very shallow in places, and obstructed by numerous rapids. At the time of my survey, the water was very low, but in the early spring the water must rise to a considerable height, as is evidenced by the marks along the banks, indicating the level of highest flood. Running out of Lake Tilden, concession four, lot number one, it takes a south-westerly course, crossing the south boundary at lot number three. There are a few small lakes in the northern part of the township, Lake Tilden at the north-east angle being the largest.

Of the whole land area of the township, I am of opinion, that between thirty and forty per cent. is fit for cultivation.

The rock exposures were principally granite, in many places very scantily covered with soil.

I did not find any traces of valuable minerals.

The latitude of the south boundary I assumed as north 46° 33′. The variation of the needle was found to be west 7° 30′.

Astronomical observations were taken frequently during the progress of the work, the details of which will be found among the returns of survey.

There are no settlers in the township.

The plan, field notes, with timber map, accompany this report.

I have the honour to be, Sir,
Your obedient servant,

F. BOLGER,
Provincial Land Surveyor.

The Honourable A. S. HARDY,
Commissioner of Crown Lands,
Toronto.

(*Appendix No. 33.*)

DISTRICT OF NIPISSING.

TOWNSHIP OF SHARPE.

TORONTO, ONTARIO,
December 18th, 1890.

SIR,—I have the honour to submit the following report on the survey of the township of Sharpe, in the district of Nipissing, surveyed under instructions from your Department, dated the 25th day of June, 1890.

The survey was made during the months of July and August last.

I adhered to all the posts already planted on the four boundaries of the township, connecting my lines therewith, with the single exception of the line between lots number six and seven, concession number six, which is run out at the north boundary to a new post planted by me at the end of said line.

In carrying out the survey I adhered to my instructions both general and particular.

The geological formation is Laurentian gneiss, two or three areas of trap rock were seen, but no indications of economic minerals were met with.

The south-west branch of the Blanche river crosses the township diagonally from north-west to south-east, being for nearly the entire distance expanded into a lake, called by the Indians "Kinogami-ji-jing," meaning "Long lake."

The water is of the usual brown tint common to the waters of northern Ontario.

Of fish, pike are rather plentiful and there are pickerel and black bass. One or two broods of ducks were seen. The shores of the lake are low and muddy and covered with timber or brush down to the water's edge.

There is no beach whatever. At one or two points, however, it was observed that the bed at the shore was composed of a fine sand. The water level must have been higher than usual this year owing to the larger rainfall. The only other lakes in the township are a muddy pond on lot four, concession three and a shallow, sandy, weedy lake on lot number three, concession one and two, and which might almost be considered a part of Long lake.

The surface of Blanche river is about one hundred and twenty feet below the level of the surrounding country and that part of the township to the south-west of the stream may be described as rolling and rocky, with a very small aggregate area, indeed, of arable land. There is a small amount of clay land adjoining the south-east shore of the lake in concessions two and three. This tract is more or less broken by rocky protuberances, and is the only place where large timber is to be found on this side of the lake.

There is a tract of sandy land also adjoining the south-west side of the lake on concession number four, five and six. The portion of the township north-east of the Blanche river contains the greater part of the good land to be found in the township. This consists of level clay land, for the most part rather wet at present, but only requiring the clearing off of the timber to become dry enough for cultivation.

On lots number eight and nine in concessions numbers four and five, there is a tract of sandy land, but it is too barren to be of any agricultural value.

The part of the township north-east of the river is generally level with some rocky areas towards the north-east.

On both sides of the lake are deep gullies cut out by the small streams that flow through them.

The timber of the township is poplar, white birch, spruce, tamarac, balsam, pine, cedar, etc.. Only a few scattering white or red pines were seen. Over two-thirds of the township is a brulè of about twenty-five years, where except on the sandy areas, the dead trees of the previous forest bestrew the ground. Much of the tamarac in the green woods, or what may be called relatively the original forest, is large enough for piles and railway ties, and the spruce, poplar and birch are also of good size.

The quantity of cedar is too insignificant to mention.

From twenty-five to thirty per cent. of the land in this township is good soil, chiefly clay,—the remainder is rocky, with the exception of the sandy tracts already mentioned. Of course there are even in the rocky tracts small patches of soil, but they are of too limited extent to be worth mentioning.

Of game there is a good deal of the kind usually met with in that country, viz., moose, carriboo and bear.

The spruce partridge is more common than the grey species.

I have the honour to be, Sir,
Your obedient servant,

JOHN McAREE,
Provincial Land Surveyor.

The Honorable A. S. Hardy,
Commissioner of Crown Lands,
Toronto.

(*Appendix No. 34.*)

REPORT OF THE SURVEY OF THE BOUNDARY BETWEEN THE DISTRICTS OF RAINY RIVER AND THUNDER BAY.

HALIBURTON, ONTARIO,
December, 20th, 1890

SIR,—I have the honour to submit the following report of the survey of the boundary between the district of Rainy River and Thunder Bay, including "tie" lines to the township of Moss, and mining locations on Portage and Magnetic lakes, surveyed under your instructions dated the 18th day of June, 1890.

I proceeded to the work on the 5th day of July last *via* Canadian Pacific Railway to Savanne, and thence by canoes along the old Dawson route through "Lac des Milles Lacs," and other waters to Hunter's Island, and thence north to the intersection of Provincial Land Surveyor Sewell's base line, with the lines between the two districts, where, at an iron post in a stone mound, after obtaining the necessary observations, I commenced my survey on the 19th day of July and ran due north one hundred and twenty miles. At twelve miles on said line I ran east astronomically four miles twelve chains, and forty-three links to the township of Moss, striking the boundary five chains and fourteen links north of its south-west angle. From the thirty-mile post I ran twelve miles west astronomically and thence north one mile sixty-six chains and thirty-six links to mining locations on Magnetic Lake. A line was also run south from the south-west angle of mining location "F. 9," south of Partridge lake, two miles thirteen chains and forty-eight links, striking the twelve-mile line nine miles, twenty-eight chains and seventy-four links west of the district boundary; the junction of the Fire Steel and Seine rivers was also tied in by running east from the forty-eight mile post on the boundary,—said junction being seventy-seven chains and seventy-seven links east of said boundary line.

The district line crosses the north rail of the Canadian Pacific railway at sixty miles, seventy-eight chains and seventy-five links and thirty chains and twelve links easterly of the three hundred and fourteenth mile post from Winnipeg,—said post being opposite English River station.

I reached the one hundred and twentieth mile point on the 30th day of October, being about seven miles north of Sturgeon lake, and some distance beyond the fiftieth parallel of latitude. As the weather was then getting cold, with several inches of snow on the ground and lakes freezing over, I returned to the line of the Canadian Pacific railway and reached Toronto on the 7th day of November.

The summer was very wet—rain falling almost every day for about six weeks after the commencement of the survey. From about the 20th day of September to the middle of October the weather was exceedingly fine.

The country through which the line passes south of the Seine river is broken and hilly with exposures of granite and Huronian rock, and no great depth of soil is to be found. What there is may be called a sandy loam.

North of the river Seine the country is more level and the soil sandy for some distance: while near Hawk Lake and the Canadian Pacific Railway line a good clay loam is to be found in places.

North of the Canadian Pacific Railway line the country is completely level

to the one hundredth mile, after which in the vicinity of and north of the lakes, it becomes more hilly and generally uneven; along the line it is more or less swampy in places and when not swampy the soil is sandy and sandy loam.

As will be seen by the plan, this country may truly be described as well watered.

The *Ka-wa-wi-ag-a-mog river* on the tenth mile is the first stream of note that is crossed; it has an average width of about eighty feet, with fast current running west, and drains the country to some distance east of the township of Moss.

Windigoostigwan lake on the Dawson route is the next body of water of importance—the water is clear and the shores are nicely wooded and banks rising to sixty or seventy feet.

Crooked Pine creek on thirty-second mile, thirty feet wide and two feet and a half deep, flows into the large lake of that name, the waters of which with other additions form the Atik-okan river.

The Seine river is over two hundred feet wide where the line crosses it about a mile west of its junction with the Fire Steel river. It flows west and has long stretches of smooth water, the land being comparatively level for a long distance up the valley of the River Seine and its tributary the Fire Steel river.

Hawk lake at the fifty-ninth mile, through which runs the English river adjoins the Canadian Pacific railway.

The English river which is first crossed by the line at the sixty-second mile is a stream varying in width from one and a half to five chains, flowing North through Selwyn lake, from which point it is sometimes called Carr's river, but might almost be called a long lake, widening out in place to half a mile in width. It runs through Mattawa lake and Lac Seul, and eventually falling into the Winnipeg river.

The line crosses this river frequently and may be said to follow its valley to the ninety-fifth mile, where it crosses Mattawa lake. Bell's lake, first touched at the one hundredth mile, is a fine sheet of water with numerous islands, and second only in importance to Sturgeon lake, which the line strikes at the one hundred and ninth mile. It is over three miles wide where we crossed it; this lake is of great length and said to be seven miles wide in places. The water is very clear and the lake well stocked with whitefish. There are numerous islands in it, which, with adjoining shores, form a noted hunting and trapping ground, the Indians coming here during the trapping season from distant parts. The Hudson's Bay Company have a trading post here and other traders are represented.

The country along the whole line has been burned at various times from seventy years down to seven years ago—large portions of it about eighteen or twenty years ago. The portion tinted pink on the plan shows the outlines of the brule of comparatively recent date, upon which birch, poplar, cherry, spruce, pitch pine, etc., are now growing up varying in diameter from two to five inches and on large portions of which is still standing the dead timber killed by the fire.

Considerable green timber of about six to twelve or fifteen inches in diameter is to be found in the country—spruce, tamarac, pitch pine, etc.

Considerable tie timber of tamarac and pitch pine is met with in many places along the line notably north of the Canadian Pacific railway along the English river.

A few groves of white pine were met with, but there is none of any consequence north of the Seine river. A considerable number of scattering trees in places south of Windigoostigwan lake, and more or less pine through the country south of and around Crooked Pine lake.

I am unable to report any great amount of land along the line fit for purposes of agriculture. Portions of it may in the distant future be taken up, but I did not see any large area of land anywhere fit for farming purposes.

The geological formations met with are the Huronian and Laurentian. Iron and other minerals doubtless exist in the country south of the Seine, and will no doubt in time be looked after. I did not meet with any minerals.

All the lakes abound with fish, and moose and carriboo are plentiful. Partridges were numerous, and I was told that prairie chicken were often met with about English River, but I did not see any.

All the lines run were well cut out and well blazed. The average magnetic declination was 6° east, although the needle was subject to fluctuations from 5° west to 15° east. North of the Canadian Pacific railway line, however, it remained almost steadily at 6° east.

Iron posts one inch and five-eighths of an inch in diameter and three feet long (gas-pipe), were planted every six miles along the one hundred and twenty miles run, viz., at VI, XII, XVIII, etc., marked with the miles, on the south side, T on the east for Thunder Bay District, and R on the west for Rainy River District, and at every three miles, or midway between the above points iron posts of same length, one inch and five-sixteenths of an inch in diameter, as nearly as may be, were planted similarly marked. At all other mile points wooden posts were planted similarly marked, and wherever practicable mounds of stone were built round both iron and wooden posts and bearing trees or boulders noted as witnesses.

In cases where the mile points came in lakes, the posts were planted on the line on the nearest land and generally on the north side of the true position. The distances from which will be found in the field notes.

Notwithstanding the fact that there was so much rock in the country, in only two cases did I find it necessary to drill holes in the rock for the reception of the posts—one of these was filled in with lead and in the other case the post was driven in so tightly with the sledge hammer that lead was unnecessary.

Astronomical observations were frequently taken, the details of which will be found in the returns of survey; accompanying this report are plan and field notes of survey, with accounts.

I have the honor to be sir,
Your obedient servant,

The Hon. A, S. Hardy,
Commissioner of Crown Lands,
Toronto.

A. NIVEN,
Provincial Land Surveyor

(*Appendix No. 35.*)

REPORT

OF

THE SUPERINTENDENT

OF

COLONIZATION ROADS.

To the Honourable A. S. Hardy,
Commissioner of Crown Lands,
Ontario.

Sir,—I have the honour to submit the report upon Colonization Roads in connection with the Crown Lands Department for the year 1890.

The amount of work accomplished is, of new roads opened, about one hundred and eighty miles; of road repairs, a little over four hundred miles; some thirty bridges of various lengths constructed, and the repair of twelve others.

I beg to observe that the road making season was unfavorable, being unusually wet; and upon low and swampy lands several instances occurred where a less quantity of grading and improving was accomplished than anticipated, but notwithstanding these drawbacks, the season's operations have been generally satisfactory, as will be noticed by the following detailed account of each undertaking, and appended summary of expenditure:—

NORTH DIVISION.

Algoma and Spanish River Road.

The forming of nine miles of road, chiefly for winter purposes. It is between Algoma Mills and Serpent River, and has been cleared, grubbed and crosswayed.

Bruce Mines and Port Lock Road.

About a mile and a half of construction, with some slight repairs over the portion previously opened.

Bruce Mines Station Road.

For this expenditure, $268.75, one mile of road was opened, and a good highway secured from the village of Bruce Mines to the railway station.

Cockburn Island Roads.

On the twentieth side line three-quarters of a mile was opened, and an equal length on the fifteenth side line, with half a mile between concessions seven and eight—two miles altogether.

Coyne's Road.

Ten miles of repairs over this comparatively new road. It was very much cut up by the heavy lumber traffic, but is now in fair condition throughout.

Current River, and Six-Mile Creek Bridges.

Two bridges built by the municipality of Shuniah: one over Current River, and the other across Six-mile Creek on the Black Bay government road, in the township of McIntyre. The cost of the first named was, according to the attested statement $665.00, and of the latter $713.50, or total of $1,378.50, of which amount the Government gave $550, the sum voted for the same.

Desert Lake Road.

A new road opened from the Great Northern road between block A and lot 9, of Plummer township, southward to Bruce Mines, about five miles.

Echo Bay Station Road.

A road between sections 17 and 20 of the township of Macdonald, from the Port Finlay road to the Echo Bay railway station. Its length is one and a quarter mile, which has been chopped, grubbed and partially ditched.

Galbraith Bridge.

A small structure over the east branch of Thessalon river, the total length of which, with approaches, is sixty feet. Half a mile of road leading to the bridge was also repaired.

Galbraith Road.

This work is on the second concession of the township, and was opened one mile. The expenditure includes the rebuilding of a fifty feet king post bridge, and renewal of abutments.

Great Northern Bridges.

Three small bridges rebuilt on the Great Northern Road over Bar River and branches, the total length being one hundred and thirty-six feet.

Kaministiquia Bridge.

Necessary repairs in consequence of settlement in some of the piers, and renewal of portions of the plank covering worn by heavy traffic.

Keewatin Bridge.

A bridge four hundred and forty-two feet long built across Portage Bay of Lake-of-the-Woods at Keewatin. It is comprised of four main openings of forty-four feet each in the clear; one of twenty-eight; one of twenty-one, and the balance of sixteen feet openings.

A floating bridge over the same bay was repaired at a cost to the Department of $300, which is included in the expenditure of $3,816.01, as given in the appended summary.

Kirkwood Road.

A new work begun between lots 9 and 10 at the south boundary of Kirkwood; thence north one mile; thence west half a mile, and thence again north half a mile, making two miles alogether of well made and most useful road.

Korah Road.

Three-quarters of a mile of a seriously flooded portion was raised throughout, and half a mile of an off-take drain opened. The road at certain seasons of the year was impassable.

Korah Third Concession Road.

About seven hundred yards of heavy grading through a stony ridge.

Lake Shore Road.

An extension of about a mile and a quarter towards Bruce Mines, and the erection of a bridge on the same road, the latter having a length of one hundred and fifteen feet.

Lefroy Road.

About half a mile opened in the township of Plummer additional, and almost an equal length repaired in the township of Lefroy, together with a bridge erected one hundred and four feet long and eighteen feet high.

Manitoulin Island Roads.

Twenty six miles were repaired, four and a half miles constructed, and one bridge built. The works were Gore and Mudge Bay Road, which was well repaired from the townline of Billings westward two and a half miles, at a cost of about $500; Lake Wolesley Road, repaired over a mile and a quarter for $75.00, and from the town line of Burpee westward four and a half miles, costing, with repairs opposite lots 22 and 23 between concessions seven and eight, Robinson, $800. A third section was four miles in the township of Burpee and a short branch one mile and a quarter long opened on the blind line between the sixth and seventh concessions, across lots 21 to 25 to a mill. Settlers contributed

teams gratis and worked for half pay for this latter work, so anxious were they for the road: the cost to the Department for this third section was only some $210. Little Current and West Bay Road, which is on the town line between Howland and Sheguiandah was improved for a length of one and a half mile for about $285; and Long Point and Lake Huron Road, or side line between lots 25 and 26, Campbell, received two and a half miles of repairs between the third and eighth concessions for the sum of $400. Three miles were repaired on the Manitowaning and Michael's Bay Road in the township of Tehkummah, costing $400, and five miles improved on the Sandfield and Carnarvon Road from the fourth concession of Sandfield northwesterly, for an outlay of a little over $500. Between lots 5 and 6 Tehkummah one and a half mile was repaired, and between 10 and 11 and concessions nine and ten one mile was opened, the cost being for the two works some $435. Tehkummah 25 and 26 Side Line work was a substantial bridge two hundred feet long erected over Manitou Creek, and half a mile of grubbing and grading south of the creek, the cost being $223. Ten Mile Point Road was for $100 raised and improved over five-eighths of one mile; and lastly, two miles of West Bay Branch Road were constructed beginning at concession ten Bidwell, thence north between lots 27 and 28 to townline of Howland; thence west to the lake and about the shore to a mill, the cost of this latter work being nearly $300.

Mississaga Bridge.

To span the river of its name on lot 6, concession six, township of Wells, and will be chiefly one opening of one hundred feet in the clear with an approach at the east end of sixty feet or thereabout. The work is in progress and $1,000 paid on account, as its erection could only be advantageously achieved during the period of ice.

Mississaga Road.

Portions repaired between Day Mills and the iron bridge over Mississaga river, perhaps four miles altogether.

Murillo Road.

About four miles of permanent repairs from the town line between Oliver and McIntyre eastward and westward. The municipality of Shuniah gave $800 towards the work, so that the Departmental expenditure is only $475.79. It is the main road into the mining district and traffic therefore heavy.

Oliver Township Roads.

These repairs were given out as jobs or contracts, but owing to a long time of very wet weather, followed by an exceedingly cold period, the contemplated work has not been finished. Two and a half miles of new road have been made as far as reported.

Otter-tail Lake Bridge.

This bridge is two hundred and five feet long, the superstructure of which was almost entirely renewed. It is now good and substantial and ought to last many years.

Parkinson Road.

Continued from the work of 1888 westward, between concessions one and two, to the line between lots 8 and 9, and from thence north one mile, giving about two miles of excellent road.

Patton Road.

A mile and a half of new road from between lots 1 and 2 Gladstone east on the second concession line.

Port Lock and Desert Lake Road.

A deviation of two and a half miles in the township of Johnston to avoid heavy hills which could scarcely be traveled over. Settlers contributed twenty days labor to assist the work.

Port Lock and Port Finlay Roads.

Upon the first named road, namely, from the east boundary of Tarbutt eastward, two and a half miles of substantial repairs were effected, the whole length being well ditched; while on the Port Finlay road proper, forty-two rods of heavy filling was done, and two bridges built, one having a span of thirty-five feet, the other a twenty-five feet opening.

Prince 3rd Concession Road.

About a mile and a half repaired on the fifth line of Prince, opposite sections 9, 10, and 11.

Rabbit Mountain and Whitefish Lake Road.

Eight miles of general repairs, which consisted chiefly of crossways, as the want of suitable material for gravelling made it impracticable to make the road sufficient for the heavy traffic in any other way.

From the termination of the opened road at the west end of Silver Mountain, two miles have been opened, leaving yet about a mile to construct before Whitefish Lake is reached.

Rainy River Road.

This road has been so much improved over fourteen miles from Fort Francis westward, as to make it excellent for winter traffic at any rate, to the point where ice can be used.

Rat Portage and Rainy River and Rat Portage and Keewatin Roads.

On the first named road, the opening of which was commenced last year crossways were built where most necessary over the four miles which had been opened, and a further extension of three miles accomplished. The country being rough and rocky, road-making is somewhat expensive, but with care in selection of route a good highway may be found reaching into the agricultural lands near Rainy River.

The second work was a thorough repairing of the main and only road between Rat Portage and Keewatin, a length of about five miles. The two municipalities interested gave $250 each towards the work, the department furnishing the balance of a little over $1,200.

Sable River Bridge.

A bridge two hundred feet long built over Sable River near Massey Station on the Algoma branch of the Canadian Pacific Railway. It has a main opening of seventy-five feet, and four of twenty feet with approaches. The main pier is thirty feet high, which, with the false works necessary for such a height, made the total cost considerably over that contemplated.

St. Joseph Island Roads.

On the island were two chief works, namely, that on the sixteenth side line from Hilton Road to "I." line, where two miles were properly opened as a first-class work at a cost of about $800, and the second, a mile and a quarter of construction across concessions C and D and front of A concession.

Slate River Valley Road.

Two miles of repairs between Point De Meuron bridge and that over Slate River, together with the opening of one mile opposite lots thirteen to fifteen inclusive, on the fifth concession line of Paipoonge township.

Spanish River Road.

Work was begun at the south-east angle of section 26, township of Salter, and continued from thence west four miles, connecting with the work of last year. It is reported as an excellent winter road cut out forty feet wide.

Thessalon Station Road.

Some necessary repairs for which $50 were allowed in connection with $75 spent by the municipality and gratis labour by the settlers.

Vankoughnet Road.

A little over three miles opened, logged and grubbed, and about a mile and a quarter of the distance properly graded. The road is opened to Beaver Lake, one of a chain of lakes which many persons were desirous to reach. The country passed through is broken and rocky, but a fair road location has been discovered.

Walford and Shedden Road.

Operations were commenced at the north-east angle of section 27, township of Victoria, thence west four miles, thence south one mile, and again west half a mile to Spanish River Station. Four miles are graded and formed into a good road, the balance being only sufficient for winter traffic.

Whitefish and Arrow Lake Road.

The distance between these lakes which are in the Thunder Bay District, west of the township of Strange, is about six miles, of which four miles have been opened but not graded, leaving two miles yet to construct before Arrow Lake is reached.

WEST DIVISION.

Ah-mic Lake Road.

This portion of the road is from the Northern Road to Ah-mic Harbour, in the township of Croft, four miles in length and repaired throughout. It is very much travelled over, and was, in consequence of continued wet weather, badly cut up.

Bordeau Road.

One and a quarter mile of construction between lots 30 and 31, McMurrich, through concessions one and two, and an equal length repaired through the third and fourth concessions.

Burk's Falls Road.

A rough section in Armour and Proudfoot two miles long and opened last year cheaply, was this season permanently improved, the doing of which, however, involved a lot of crosswaying and the construction of some fourteen culverts. A dangerous hill known as "Robbs," was also very thoroughly repaired at a cost of about $300.

Cardwell Junction Road.

Four miles of repairs from Novar station westward. This is the main road from Ilfracombe to the railway.

Croft Road.

A road between lots 25 and 26 of Hagerman, was repaired between concessions three to seven, two and a quarter miles.

Denville Swamp Road

Is between the fourth and fifth concessions of Chapman and Strong. A mile has been opened this year across lots 1 to 4 inclusive of Chapman, and about half a mile of the older portion well repaired, chiefly crosswaying.

Distress River Road.

Two miles of substantial repairs from the Muskoka road westward. The road being low was difficult to improve without a larger expenditure than usual, but it is now in excellent condition over this section.

Draper Bridge.

The renewal of a bridge built about fourteen years ago over the south branch f Muskoka River, on the eighth concession line of the township of Draper. The otal length is two hundred and twenty-nine feet, and main span one hundred eet in the clear.

Eagle Lake Road.

Four miles of repairs from South River westward towards Uplands, an excellent job.

Hillside Road.

A short road about three-eighths of a mile in length, opened from Peninsula Lake to the Muskoka and Bobcaygeon Road, between lots 20 and 21, in the fourteenth concession of Franklin, the object being to give settlers communication with the steamboats, which will be a great advantage to many.

Himsworth Road.

An extension from lot 8, between concessions twelve and thirteen, Himsworth, eastward to lot 2, Chisholm, two and a quarter miles. The work was very heavy, involving two thousand feet of ditching through a muskeg.

Junction No. 1 Road.

The repairing of eight miles between Spence and McKellar, with some repairs upon the bridge over Old Man Creek.

Junction No. 2 Road.

From Christie Road northward to the twelfth concession of Christie, two and three-quarter miles were repaired, and on the town line between Humphrey and Christie, from lot 15 westward one mile and a quarter was also improved.

Katrine Bridge.

The renewal of the main truss with other repairs which are not yet completed. Estimated cost, $350 to $400, of which $200 have been paid on account.

Longford and Oakley Townline Road.

Two miles opened and properly graded and nearly one mile chopped out. The road is located as follows: commencing at lot 29, between Longford and Oakley, and angling from thence through lots 30, 31, 32, in the first concession of Oakley, and lots 34, 35, 36, of the twelfth concession of Longford, from whence the town line between Ryde and Draper is approximately followed to roads already established. The portion made this season is from the above named lot 29 westward.

Macaulay Road.

Repairs continued from last year's operations westward two and a half miles. The municipality of Macaulay contributed fifty dollars additional to the departmental outlay which was also spent in this improvement.

Magnetawan River Bridge.

Erected between the eleventh and twelfth concessions of Armour, and being one-eighty feet clear span upon piers twelve feet high, with earth approach at west end, and a trestle structure at its east end, altogether a length of about one hundred and fifty feet. The work is yet unfinished.

McDougall Road.

Five miles of repairs between Parry Sound and McKellar township. A rough road through a rough country, but very important to settlers.

McKellar Centre Road.

Repaired four miles beginning at Junction No. 1 Road, and from thence to lot 20, concession eight, and again through concessions four to eight on the road allowance between lots 20 and 21, all in the township of McKellar

McMurrich 10 and 11 Side Line Road.

New work consisting of a mile and a quarter of road construction on the road allowance between lots 10 and 11, from the Monteith and Perry Road through the ninth and tenth concessions.

Mill's Road.

Three miles repaired northward from the Northern Road. The very wet season made the work upon this and many other roads both difficult and expensive.

Mill's and Stark Swamp Road.

This work is on the road allowance between the sixth and seventh concessions of the township of Armour, consisting of a little less than three-quarters of a mile of crosswaying across lots 16, 17 and portion of 18.

Mill's and Wilson Road.

Half a mile constructed in the township of Hardy, between the second and third concessions, from lot 20 eastward, and a bridge sixty feet long and forty feet opening, built over Wolfe River.

Missionary Road.

This road lies between the fourth and fifth concessions of the townships of Spence and Ryerson, and received three miles of very substantial repairs from Rosseau and Nipissing Road eastward.

Muskoka Road.

In the township of Machar a mile and a quarter was built through the eleventh and twelfth concessions, approximately between lots 20 and 21, and farther north an equal length was built on the town line between Gurd and Himsworth, from Westphalia Road northward through the second and third concessions.

Four miles of excellent repairs were effected between Burk's Falls and Berriedale, and ten miles improved in the townships of Perry and Chaffey on the same road.

Muskoka and Bobcaygeon Road.

Three miles constructed through a heavily timbered and rocky section. The work was commenced on lot number 8, concession eight, Franklin, thence south through lot 8, concession 7; lot 7, concession 6; and around the lake shore on lot 6, concession 5 to about,the centre of the last mentioned lot. This road will serve the settlers of the sixth and seventh concessions admirably, and if continued, would open a way for those resident in the fourth concession also.

Muskoka and Ryerson Junction Road.

Repaired from lot 11 eastward to the Muskoka Road, with a quarter mile on the latter, making altogether four miles of work.

Musquosh Bridge.

The renewal of the bridge over Musquosh River, at Bala, built originally in the year 1873. The present structure is one having a main span of eighty feet clear, one of forty feet, and two of each thirty and twenty feet, with a total length of one hundred and ninety-five feet, and is well and cheaply built.

Northern Road.

Completion of repairs between Commanda and Golden Valley Road, a mile or over, with the improvement of a long and heavy hill on the latter road. The work is of the most substantial character making an excellent highway leading to the railway.

North Cardwell Road.

Work continued from lot 17, concession fourteen, Cardwell, through lot 17, in the first and second concessions, and lot 16, in the third concession of Monteith, two miles and a quarter of heavy construction.

North-West Road.

Two and a quarter miles opened in the township of Shawanaga from the west side of the Indian Reserve, and south-east angle of lot 38, concession six westward across said lot, and lots 29, 30, 31, 32 in the seventh concession, and over lots 32, 33, 34 to the steamboat landing on Georgian Bay, and north end of lot 35. This makes connection with a winter road through the Reserve to the main road in that district.

Two and a half miles were also repaired in the township of Carling from the point of ending of last year's operations on the same road.

Oka Road.

General repairs from the west town line of Wood north-westward about five miles.

It is reported by the inspector that the settlers, who are Indians, are making great improvements and putting up a very fair class of dwellings and barns.

Oakley 25 and 26 Side Line Road.

The opening of a road through concessions eight to thirteen on above line, the portion through the eleventh and twelfth concessions being properly grubbed and graded, and balance opened for winter traffic only. The length is two and a half miles.

Orange Valley Road.

A road between the Rosseau and Nipissing road and Broadbent's mill in the township of McKellar, and repaired from last year's work to the mill, a mile and a half. It is an important road leading to railway communication at Burk's Falls.

Parry Sound Road.

Four bridges replaced, aggregating a length of about six hundred and sixty feet, and over two miles of substantial repairs. The bridges are between Rosseau and Parry Sound, and the road repairs were chiefly east of Rosseau.

Pringle Road.

A new road commenced between concessions eight and nine of Pringle, at about the centre of lot 5, and continued from thence through the said lot, and through lots 4 and 3, concession ten and lot 3, concession eleven, the length being two miles, and the work of excellent description.

Restoul Lake Road.

This is on the road allowance between concessions eight and nine of Nipissing extending westward from the Rosseau and Nipissing road. This season it was opened from lot 20 to lot 28, one and three-quarters mile. The road is, of course, incomplete and rough, but is still very useful to settlers in the northern portion of Gurd for whom it is their only outlet.

Rosseau and Nipissing Road.

Five bridges repaired between Spence and Rosseau, and now in good condition. The chief work was upon North Seguin and Dufferin bridges.

Ryerson Centre Road.

A pile structure three hundred and twenty-eight feet long over a flat which was annually flooded and traffic impeded. The main opening is forty feet, the balance fifteen feet each. The earth approaches are nearly five hundred feet long. The work is of a most permanent character.

Severn River Bridge.

The counties of Simcoe and Ontario built this structure at a cost of $1,303 of which the department contributed one-third as per agreement.

South Armour Road.

Repairs made from near the railway lot 10, concession three, Armour, eastward two miles, thus improving a portion which was well nigh impassable.

South Bay Road.

The construction of a mile and three-quarters, commencing at lot 11, concession eleven, near Beatty's Creek, thence north-westerly half a mile, and thence winding about and near South River to lot number 23 of the thirteenth concession, all in the township of Nipissing.

South River Road.

Two and a half miles of this road repaired in the township of Joly, one-half of which was practically new work, as in consequence of the flooding of more than a mile by the damming of South River—which appears to be necessary for lumbering purposes—this distance had to be raised above the flooded water line.

Surprise Lake Road.

New work began at lot 6, concession five, Laurier, and extended two miles to lot 12 between the sixth and seventh concessions.

Trout Creek Bridge.

Built over Trout Creek on the side-line between lots 25 and 26 in the second concession of Himsworth. The main span is sixty feet in the clear, with one end span of twenty-nine feet and another of twenty feet. Total length of bridge one hundred and thirty-three feet, with earth approaches of sixty-six feet.

Watt 4 and 5 Concession Line Road.

Repaired from Parry Sound road westward three miles towards Ufford, and following about the margin of Three-Mile Lake where the concession line was found to be impracticable.

Westphalia Road.

Two miles thoroughly opened and graded, dating from last year's work westward to lot number twelve of Gurd township.

Whitestone Valley Road.

Permanent repairs over two miles from the northern road westward.

EAST DIVISION.

Addington Road.

Eight miles repaired between the head of Massanoga Lake and a point three miles north of Cloyne, also the portion which connects this road with Mississippi Road was thoroughly repaired over its length of three miles.

Alice B. Line Road.

The improvement of three heavy hills extending over about one-eighth of a mile.

Alice 5 and 6 Side Line Road.

The improvement of three and three-quarters miles upon this road which had been opened previously in a somewhat rough manner. It is through concessions ten to fourteen of Alice and reaching the south boundary of Petewawa township

Alice 12 and 13 Concession Road.

A mile and a quarter of repairs between lots 20 to 25 on the twelfth and thirteenth concession road allowance of Alice.

Allsaw Road.

Two and a quarter miles of construction in the township of Minden, beginning in the seventh concession at lot 26, thence northward to Sawyer's Lake, and thence about the shore through lots 25 in the eighth and ninth concessions.

Barrie Road.

Repairs commenced about four miles east of the Addington Road and extended eastward four miles.

Barrie Bay Road.

Two bridges built on this road, one being on lot number six and the other on lot number nine of the township of Fraser. The lengths are respectively eighty feet and one hundred and ninety-three feet beside the earth approaches, and are good solid structures.

Black River Bridge.

A bridge on the Ryde Road between Dalton and Rama, which cost $664.80, and was paid by the counties of Victoria, Ontario and the Department, each contributing one-third the sum.

Bobcaygeon Road.

Repaired in two sections, one being from Peterson Road northward five miles, and the second, four miles between the townships of Harvey and Verulum.

Bonfield and Callender Road.

Two miles and a half constructed, commencing between the second and third concessions, lot 9 of Bonfield, thence southerly to the town line between Bonfield and Boulter, and again south-westerly into the latter township.

Booth Road.

A new road built two and a half miles, commencing at the Anstruther Road lot 37, concession twelve, Anstruther, and ending on the line between lots 30 and 31 in the thirteenth concession.

Buckhorn Road.

About four and a half miles of repairs were effected on that portion which is the boundary between Glamorgan and Cavendish from lot one to lot five, and between Galway and Snowden from lot twenty to lot thirty-two. One and a quarter mile was also constructed from lot twelve on the concession line between seventeen and eighteen to lot number eight. On a southerly portion of the same road, namely, between lots 26 and 27 township of Smith, a heavy filling through a low section one hundred rods in length was made, the township of Smith giving $200, and the county of Peterborough $100 towards this latter work.

Burleigh Road.

Seven miles of repairs from lot number four in the first concession of Harvey northward.

Bromley 9 and 10 Side Line Road.

One mile of work over that previously chopped out between lots nine and ten Bromley, from the seventh concession westward.

Callender and North Bay Road.

The continuation of this road was begun at lot number four, and extended westward on the road allowance between the tenth and eleventh concessions of Bonfield to intersect the Ferris and Bonfield Road—about two miles of mostly new work.

Calvin Road.

The portion made last year, except a quarter of a mile, was this season thoroughly repaired, the length being two and a quarter miles. In addition, the road allowance between lots 10 and 11 was chopped out through the second, third and fourth concessions, a distance of one and three-quarters mile as a winter road.

Chandos Road.

Four miles of excellent repairs from last season's operations easterly.

Combermere Bridge.

A work reported last year as in progress and now completed. The bridge which the present structure replaces was built eighteen years ago, and therefore did good service as a wooden bridge, and it is expected the new one will be equally successful in aiding the public.

Copper Cliff Road.

The improvement of three and a quarter miles between Sudbury and Copper Cliff mines over a route previously opened and formed by the inhabitants, and which is adjacent to and almost parallel with the Algoma branch of the Canadian Pacific Railway.

Denbigh Road.

From Hyde's Chute bridge south-westerly nearly eight miles were repaired this season, including several deviations found to be advantageous.

Devil's Lake Road.

A new road leading to the railway at Irondale and being four and a quarter miles in length, cut thirty feet wide throughout, and half a mile gra led. Its course is from lot 30, concession four, of Snowden in a south-easterly direction two miles ; thence south half a mile, following the boundary between Snowden and Glamorgan to the second concession of the latter township, and thence again southward to Whitefish Lake school house.

Douglas and Cobden Road.

The raising half a mile of a low wet portion across lot number twelve of the seventh concession of Bromley.

Douglas and Haley's Station Road.

Bridging Byre's Creek on lot four, concession nine, Bromley. Total length with approaches about one hundred and fifty feet, and general height eight feet.

Eganville and Killaloe Road.

Repairs have been made from Killaloe three miles eastward to the boundary between Hagarty and South Algoma.

Ferguson Lake Road.

This road was improved between lot number three, concession twelve, and lot number one concession ten, of the township of Brougham, two miles.

Ferris and Bonfield Road.

The construction of two and three-quarters miles from the boundary between Ferris and Bonfield at lot one, concession seven, westward to lot number eleven

Frontenac Road.

Six miles repaired between Plevna and Ardoch, and eight miles between Long Lake and Peterson's crossing.

Galway and Cavendish Road.

A work extending from lot 24, between concessions fourteen and fifteen of Galway, eastward through the township and into Cavendish, altogether a length of over five miles, of which three miles were construction and the balance repairs

Gannon's Narrows Road.

A road between the fifteenth and sixteenth concessions of Harvey and repaired over three and a quarter miles of its length ; the county of Peterborough and township of Harvey each contributing $100 towards the work.

German Line Road.

The sum of $108.90 spent in grading and improving a heavy hill between lots 35 and 36 of Galway.

Golden Lake Road.

This work is on the line between lots five and six of South Algona, from the Eganville and Killaloe road northward, and is one mile of construction through a very rough section.

Hagarty and Brudenel Road.

One and a half mile repaired over a very rough portion. The road is on the boundary between the townships which the name of the road indicates, and the work from lot number twelve of Hagarty eastward.

Hagarty 2 and 3 Con. Road.

A new road opened between the second and third concessions of Hagarty from lot 25 westward a mile and a quarter.

Hardwood Bay Road.

Commencing at Pollywog Lake on the Perth Road and on lot 5, concession thirteen, Bedford this road was extended to lot 5, concession nine of the same township, a distance of about four miles and made fairly travelable throughout.

Hinchinbrooke Road.

From the south boundary of Hinchinbrooke repairs were made six miles northward to Napanee River.

Hurd's Creek Bridge.

A heavy and substantial bridge ninety-eight feet long with main opening of twenty-eight feet erected over Hurd's Creek on the Eganville and Foy road about four miles from Eganville.

Hyde's Chute Bridge.

A balance of $462,17 paid on account of this structure, which was reported last year, It replaces a bridge built seventeen years ago.

Kennebec Road.

Repairs in the township of Kennebec from the floating bridge (lot 19, con. 8) westward about 6 miles.

Lavant Road.

This is the completion of the road opened last year and then described, namely, two miles between lots 10 and 11 of Darling through concessions two, three and four.

Lutterworth Road.

Repairs in Lutterworth from lot 6 to west side of lot 9 on the road allowance between the second and third concessions—about three miles.

Mattawa and Callender Road.

Two miles repaired from intersection of Calvin road easterly towards Mattawa.

Mattawa and Temiscamingue Road.

In addition to the repairing of a mile and a half in the township of Mattawa four miles and a half were constructed in a northwesterly course over what had been opened as a winter trail.

Methuen Road.

An old road in Chandos repaired over three and a half miles of its length.

Minden and Gelert Station Road.

The main road between Minden and the railway was repaired over a length of six miles.

Mississippi Road.

Sixteen miles of repairs from the Addington Road westward, the first six miles receiving the greater attention.

Monck Road.

A bridge over Cranberry Creek built in part two years ago was completed this year by planking its length of one hundred and six feet; and in the township of Dalton, three miles were well repaired.

Monmouth and Glamorgan T. L. Road.

This work is from the Monck road northward two miles, but chiefly half a mile of crosswaying, which is highly prized by the inhabitants.

Monmouth Junction Road.

A new road opened three and a quarter miles, approximately between lots 15 and 16 of Monmouth, through concessions nine to fourteen. The Phosphate Mining Company gave $200 in cash towards the work and also built a bridge one hundred and sixty feet long over a neck of McEwen's Lake.

Nogey's Creek Road.

Repairs over two and a half miles in the township of Harvey from lot 24, concession seventeen, northward.

North Algona and Wilberforce Road.

The construction of a mile and a quarter on the town line between Wilberforce and North Algona, from concession twenty-one northward, and includes one hundred rods of crosswaying.

North Bay and Temiscamingue Road.

Three and a half miles repaired from lot 19, concession B. Widdifield, east and north.

North Bay and Trout Lake Road.

Mostly repairs from North Bay and Temiscamingue Road eastward to Jessup's farm on Trout Lake, thus making a very fair road to this latter point.

North Bay and Widdifield Road.

An extension northward from the third concession of Widdifield, between lots 20 and 21, two and a half miles to Cheney Creek, and repair of five miles of the portion previously opened as Widdifield Road. It is said that a continuation of the road would open up some very fine agricultural lands.

North Harvey Road.

This work is between lots 11 and 12, from the fourth concession eastward, a mile and a half of heavy construction. It shortens the distance by road between Buckhorn and Burleigh Falls about 20 miles, so it is stated.

Opeongo Road.

Five miles repaired from D'Acre westward.

Palmer Rapids Road.

A deviation of a little less than two miles was made from the south boundary of Ratcliffe, beginning at lot 33, to avoid natural difficulties, and the remaining distance between Palmer Rapids and Peterson Road, six miles, was put in very good condition.

Papineau 12 and 13 Con. Road.

Almost entirely new work and a little over three miles in length, consisting of the opening of the road allowance between the twelfth and thirteenth concessions of Papineau across lots 18 to 26: as also the formation of a fair road from lot 18 northward to the fourteenth concession.

Paudash Lake Road.

This road is in the township of Cardiff and was begun at the Burleigh road at the west side of lot 12, between concessions four and five, thence eastward half a mile, thence northeasterly to the line between concessions six and seven, and thence again eastward crossing lots to the east side of lot 23, about four miles altogether of mostly new work, and leading to the village of Bancroft.

Pembroke and Mattawa Road.

Repaired from the boundary between the townships of Head and Rolph eastward six miles, and westward an equal length, or twelve miles altogether.

Pembroke and Algona Road.

Half a mile of repairing on the twentieth concession line of Wilberforce across lots 12 and 13. The work was chiefly lowering the gradients of hills which were very steep.

Perrault Settlement Road.

From Eganville southward, three miles of repairs were made, and about one hundred dollars were spent in improving half a mile of a road from this main one southwesterly from lot 21, concession seventeen of Grattan.

Perth Road.

The repair and improvement of this road from about one mile north of Westport to the north boundary of North Crosby, a length of six miles or thereabout. The work is understood to be of a very substantial character.

Peterson Road.

This road has been put in very good condition from the west boundary of Herschel eastward five miles.

Petewawa Road.

Three-quarters of a mile of road opened in the township of Petewawa, along the east side of lot 25, from the road allowance between the second and third concessions southward.

Petewawa and Alice Road

The town line between the townships, and repaired and opened three miles from lot 1 to lot 10, half a mile being new.

Reid Road.

A new road, one portion being on the sixteenth concession of Galway from lot 1 eastward two miles; and a second, through lot 16, from the fifteenth to the sixteenth concessions. The county of Peterborough gave $100 and the municipality of Galway $50 to aid in the work as agreed upon.

Rolph Road.

A road constructed between lots 10 and 11 of Rolph, from the boundary between Rolph and Wylie westward, one and three-quarters mile, to connect with a highway leading to Wylie Station on the Canadian Pacific Railway.

Rolph and Buchanan T. L. Road.

A continuation from last year's work and extending on the line between Range B. and concession one of Buchanan, nearly one mile. Chalk River bridge on the Pembroke and Mattawa road, was also repaired.

Ross and Bromley Road.

The opening of three-quarters of a mile across lots 13 to 15 of Ross township, and repair of four and a half miles of the same road from the said lot 13 northward to the Eganville Road.

Ryde Road.

The grant made last session of $500 was expected to be sufficient to complete the opening of this road, but owing to rain and other difficulties only a mile and a half of construction was accomplished, leaving some one hundred and thirty-five rods unfinished. It is on the town line between Rama and Dalton.

Sharbot Lake Bridge.

General repairs including new hand-railing.

Snake River Bridge.

A bridge built over Snake River between lots 21 and 22, in the second concession of Bromley. Its length is ninety-four feet and the length of filling at its east end two hundred and sixty feet. The west approach is unfinished.

South Algona 5 Concession Road.

Two and a half miles repaired from the fifth concession line of South Algona, at lot 23 eastward and about the shore of Silver Lake to lot 15.

Stafford 6 and 7 Side Line Road.

New work; being two miles of construction through concessions two to five on the side line indicated.

Sturgeon Falls Road.

Five miles opened and six miles repaired. The new work is on the town line between Springer and Caldwell two miles to the fourth concession and thence west three miles to Verner Station on the railway. The first seven miles of the road are reported as good, the balance yet requiring further expenditure to make it useful at all seasons of the year.

Sudbury Road.

This road which was begun at Sudbury last year, has been continued to Chelmsford, a total distance of about thirteen miles. Of the six and a half miles previously opened, about three miles were repaired and the balance fairly opened and graded, that is to say, about four miles have this year been constructed, one

and a half miles opened as a winter road and three miles repaired. A comparatively small outlay upon the mile and a half mentioned would give an excellent road between these points, Sudbury and Chelmsford.

The following is a description of its position: commencing at lot 6, concession 4, township of McKim, and from thence passing through the said lot; lots 7 and 8 in the same concession and lots 8, 9, 10, 11 in concession 5, when on the last named lot it crosses the Canadian Pacific Railway, passing into lot 12 in the same concession, through lot 12, in concession 6, into lot 1, concession 1, Snider, and continuing through lots 1 to 4 in the last mentioned concession till it strikes the line between concessions 1 and 2, near the centre of the last named lot 4; thence west on said line ten chains; thence north-westerly almost parallel with the railway through lots 5, 6, 7, to lot 8 on the line between the 2nd and 3rd concessions; thence west on this last line to the point between lots 10 and 11; thence north-west to the town line at the point met by the 2nd and 3rd concession line of Balfour, and thence west on the line last mentioned half a mile to the point of division between lots 1 and 2 of Balfour, and from whence the residents have opened a road into the village or railway station. The work has been generally well done, notwithstanding the excessively rainy season.

Sudbury and Blezard Road.

From the village of Sudbury this new road has been opened northward into the township of Blezard, and the southerly two miles properly graded and ditched. About three-fourths of a mile is also well opened, crosswayed and partially covered, and a rough but substantial bridge one hundred and two feet long built. The remaining length of about three and a half miles was in some measure improved, but not at all permanently. The unusually wet season doubtless interfered with the accomplishment of more and better work and this may be said truly with reference to a great number of the season's operations through low lands and swampy sections.

Sydenham and Bedford Road.

About eight and a half miles repaired from Desert Lake to Fermoy, and over what is called the Sydenham and Fermoy Road, repairs were made from Desert Lake southward nine and a half miles.

Trout Lake Junction Road.

A continuation northward of this work between lots 22 and 23 of Ferris, the length constructed this season being two and a quarter miles. The road is now within a short distance of its destination, Trout Lake.

Waugh Road.

About four miles of repairing, mostly on the town line between Anson and Lutterworth.

Westmeath Road.

One mile of construction from lot 6 to lot 9, between concessions one and two, Cologne Lake Front, township of Westmeath.

Westmeath and Muskrat Lake Road.

A road extending from lot 22, concession one, of Westmeath, into the township of Pembroke, to connect with the main road which is distant from the point of commencement three miles ; over which general repairs were made.

Widdifield and Phelps Road.

Continued eastward between concessions A and B, of Widdifield, one and a half miles to the east side of lot number 10. It was a heavily wooded section and very rocky.

Wilberforce Road.

About three-eighths of a mile of road opened between lots 5 and 6, Alice, from the town line between Alice and Wilberforce to the main road leading to Eganville. Some improvement was also made opposite lot 5, Wilberforce, on the said town line.

Wilberforce 18 Concession Road.

The making of half a mile across lots 26 and 27, on the eighteenth concession line of Wilberforce.

Wilberforce 19 and 20 Concession Road.

Another new work extending from the Eganville Road to the District Line between Stafford and Wilberforce, a mile and a quarter in length.

York River Bridge.

This bridge is over York River on the Monck Road, near Bancroft, and replaces one built twenty years ago. It is, as was the first one, one hundred and twenty-five feet long, with main span of sixty feet. The main piers are eighteen and fifteen feet high respectively, built with cut water fronts, and each filled with stone to high water line.

Young's Point Road.

Two and a half miles of repairs from lot 21 on the road allowance between concessions five and six, of the township of Douro, to Young's Point bridge, at lot 25, of concession three.

SUMMARY OF EXPENDITURE ON COLONIZATION ROADS AND BRIDGES IN THE YEAR 1890.

NAME OF WORK.	Cash.	Supplies from Department.	Total.
NORTH DIVISION.	$ c.	$ c.	$ c.
Algoma and Spanish River ..... Road	813 27	176 07	989 34
Bruce Mines and Port Lock ..... do	420 31	87 77	508 08
Bruce Mines Station ..... do	268 75	.....	268 75
Cockburn Island ..... do	496 94	16 18	513 12
Coffin, 3rd Concession (balance) ..... do	31 05	.....	31 05
Coyne's ..... do	407 29	89 81	497 10
Current River and Six-Mile Creek ..... Bridges	550 00	.....	550 00
Desert Lake ..... Road	826 12	.....	826 12
Echo Bay Station ..... do	552 02	.....	552 02
Galbraith ..... Bridge	100 00	.....	100 00
Galbraith ..... Road	400 38	.....	400 38
Great Northern ..... Bridges	199 78	.....	199 78
Inspection, including balance of '89	1,946 49	.....	1,946 49
Kaministiquia ..... Bridge	258 97	.....	258 97
Keewatin ..... Bridges	3,800 00	16 01	3,816 01
Kirkwood ..... Road	422 60	89 81	512 41
Korah ..... do	314 83	90 51	405 34
Korah, 3rd Concession ..... do	200 00	.....	200 00
Lake Shore ..... do	266 22	.....	266 22
Lefroy ..... do	460 00	.....	460 00
Manitoulin Island ..... Roads	4,131 62	107 40	4,239 02
Mississaga ..... Bridge	1,000 00	.....	1,000 00
Mississaga ..... Road	546 76	.....	546 76
Murillo ..... do	1,275 79	.....	1,275 79
Oliver Township ..... Roads	700 00	.....	700 00
Ottertail Lake ..... Bridge	340 99	.....	340 99
Parkinson ..... Road	750 00	134 60	884 60
Patton ..... do	380 60	.....	380 60
Port Lock and Desert Lake ..... do	500 69	.....	500 69
Port Lock and Port Finlay ..... Roads	910 00	.....	910 00
Prince, 3rd Concession ..... Road	180 00	.....	180 00
Rabbit Mountain and Whitefish Lake ..... do	2,150 30	.....	2,150 30
Rainy River ..... do	2,608 97	330 67	2,939 64
Rat Portage and Keewatin Road and Bridge ..... (balance)	16 59	.....	16 59
Rat Portage and Rainy River Road ..... do	121 95	.....	121 95
Rat Portage and Rainy River and Rat Portage and Keewatin Roads	3,511 78	.....	3,511 78
Sable River ..... Bridge	2,272 79	136 16	2,408 95
St. Joseph Island ..... Roads	750 00	243 55	993 55
State River Valley ..... Road	758 36	.....	758 36
Spanish River ..... do	499 68	.....	499 68
Thessalon Station (balance) ..... do	21 75	.....	21 75
Thessalon Station ..... do	50 00	.....	50 00
Vankoughnet ..... do	642 98	103 50	746 48
Walford and Shedden ..... do	823 08	176 92	1,000 00
Whitefish and Arrow Lake ..... do	1,048 10	.....	1,048 10
	38,727 80	1,798 96	40,526 76
MUNICIPAL GRANTS AND REFUNDS—			
Shuniah, account of Murillo Road $800 00			
Keewatin, account of Rat Portage and Keewatin 250 00			
Rat Portage account of Rat Portage and Keewatin 250 00			
Parkinson 68 59			
Desert Lake 25 75	.....	.....	1,394 34
Total Departmental Expenditure, North Division	.....	.....	39,132 42

SUMMARY OF EXPENDITURE, ETC.—*Continued.*

NAME OF WORK.		Cash.	Supplies from Department.	Total.
WEST DIVISION.		$ c.	$ c.	$ c.
Ah-mic Lake	Road	721 10	.....	721 10
Bordeau	do	416 10	97 69	513 79
Burk's Falls	do	989 01	142 30	1,131 31
Cardwell Junction	do	477 37	.....	477 37
Commanda Creek (balance)	Bridge	4 62	.....	4 62
Croft	Road	641 10	158 61	799 71
Denville Swamp	do	607 40	.....	607 40
Distress River	do	498 49	.....	498 49
Draper, 8th concession (1889)	Bridge	100 00	.....	100 00
Draper	do	1,425 05	172 48	1,597 53
Eagle Lake (balance)	Road	5 12	.....	5 12
Eagle Lake	do	499 96	.....	499 96
East River (balance)	Bridge	484 03	.....	484 03
Gurd	do	104 40	.....	104 40
Hillside	Road	200 25	.....	200 25
Himsworth	do	832 72	167 23	999 95
Inspection, including balance of '89		1,821 26	.....	1,821 86
Junction, No. 1	Road	311 70	.....	311 70
Junction, No. 2	do	779 19	.....	779 19
Katrine	Bridge	200 00	.....	200 00
Longford and Oakley town line	Road	689 30	60 70	750 00
Macaulay	do	506 16	91 52	597 68
Maganetawan River	Bridge	900 00	171 47	1,071 47
Maple Island (balance)	do	13 37	.....	13 37
McDougall	Road	500 00	.....	500 00
McKellar Centre	do	505 50	.....	505 50
McMurrich, 10th and 11th side line	do	281 70	10 00	291 70
Mills (balance)	do	188 42	.....	188 42
Mills	do	427 96	91 56	519 52
Mills and Stark's Swamp	do	255 43	.....	255 43
Mills and Wilson	do	438 05	90 96	529 01
Missionary	do	499 98	.....	499 98
Muskoka	do	1,798 37	109 66	1,908 03
Muskoka and Bobcaygeon	do	516 71	.....	516 71
Muskoka and Ryerson Junction	do	500 00	.....	500 00
Musquosh	Bridge	988 64	.....	988 64
Nipissing	Road	50 00	.....	50 00
Northern	do	451 96	98 53	550 49
North Cardwell	do	506 93	.....	506 93
North-West	do	748 44	.....	748 44
Oka	do	642 42	205 45	847 87
Oakley, 25th and 26th side line	do	634 61	110 73	745 34
Orange Valley	do	300 04	.....	300 04
Parry Sound	do	2,070 43	184 46	2,254 89
Pringle	do	505 36	.....	505 36
Rainy Lake (balance)	do	24 00	.....	24 00
Restoul Lake	do	300 80	.....	300 80
Rosseau and Nipissing	do	502 90	.....	502 90
Ryerson Centre	do	1,106 28	.....	1,106 28
Severn River	Bridge	434 34	.....	434 34
South Armour	Road	301 23	.....	301 23
South Bay	do	589 80	.....	589 80
South River	do	504 98	.....	504 98
Stephenson town line (balance)	Bridge	50 47	.....	50 47
Surprise Lake	Road	402 23	119 83	522 06
Trout Creek	Bridge	550 00	.....	550 00
Watt, 4th and 5th concessions	Road	499 34	.....	499 34
Westphalia (balance)	do	45 19	.....	45 19
Westphalia	do	816 30	190 60	1,006 90
Whitestone Valley	do	580 41	120 27	700 68
Total West Division		32,747 52	2,394 05	35,141 57

SUMMARY OF EXPENDITURE, ETC.—*Continued.*

NAME OF WORK.	Cash.	Supplies from Department.	Total.
EAST DIVISION.	$ c.	$ c.	$ c.
Addington.....Road	1,364 62	160 42	1,525 04
Alice, "B" line.....do	200 00	.....	200 00
Alice, 5 and 6 side line.....do	415 97	.....	415 97
Alice, 12 and 13 con.....do	409 95	.....	409 95
Allsaw.....do	450 00	45 73	495 73
Barrie.....do	501 22	.....	501 22
Barrie Bay.....do	401 55	.....	401 55
Black River (1889).....Bridge	221 60	.....	221 60
Bobcaygeon.....Road	399 87	16 90	416 77
Bobcaygeon No. 2.....do	605 86	.....	605 86
Bonfield and Callender.....do	842 30	163 08	1,005 38
Booth.....do	480 00	.....	480 00
Buckhorn.....do	1,080 53	.....	1,080 53
Burleigh.....do	390 00	.....	390 00
Bromley, 9 and 10 side line.....do	202 40	.....	202 40
Cameron (balance).....do	210 76	.....	210 76
Callender and North Bay.....do	484 67	.....	484 67
Calvin.....do	562 91	.....	562 91
Chandos.....do	200 00	.....	200 00
Clare River (balance).....Bridge	10 00	.....	10 00
Combermere "do	908 50	.....	908 50
Copper Cliff.....Road	200 95	.....	200 95
Denbigh.....do	515 52	.....	515 52
Devil's Lake.....do	362 87	41 68	404 55
Douglas and Cobden.....do	233 00	.....	233 00
Douglas and Haley's Station.....do	199 00	.....	199 00
Eganville and Cobden (balance).....do	61 75	.....	61 75
Eganville and Foy "do	11 00	.....	11 00
Eganville and Killaloe.....do	510 58	.....	510 58
Ferguson Lake.....do	500 00	.....	500 00
Ferris and Bonfield.....do	800 00	161 94	961 94
Frontenac.....do	1,004 11	.....	1,004 11
Galway and Cavendish.....do	873 75	.....	873 75
Gannon's Narrows.....do	425 09	.....	425 09
German Line.....do	108 90	.....	108 90
Golden Lake.....do	405 33	.....	405 33
Hagarty and Brudenel.....do	513 76	.....	513 76
Hagarty, 2nd and 3rd concession.....do	573 32	.....	573 32
Hardwood Bay.....do	424 87	.....	424 87
Hinchinbrooke.....do	100 00	.....	100 00
Hurd's Creek.....Bridge	349 63	.....	349 63
Hyde's Chute (balance).....do	403 61	58 56	462 17
Inspection, including balance of 1889.....	3,305 90	.....	3,305 90
Kennebec.....Road	500 00	.....	500 00
Lavant.....do	511 60	.....	511 60
Lutterworth, South.....do	202 75	.....	202 75
Mattawa and Callender.....do	501 64	.....	501 64
Mattawa and Temiscamingue.....do	836 50	162 78	999 28
Methuen.....do	480 00	.....	480 00
Minden and Gelert Station.....do	323 70	80 38	404 08
Mississippi.....do	513 80	.....	513 80
Monck.....do	550 37	.....	550 37
Monmouth and Glamorgan town line.....do	308 73	.....	308 73
Monmouth Junction.....do	999 99	.....	999 99
Nogey's Creek.....do	261 92	.....	261 92
North Algona and Wilberforce.....do	504 16	.....	504 16
North Bay and Temiscamingue.....do	400 00	.....	400 00
North Bay and Trout Lake.....do	405 64	.....	405 64
North Bay and Widdifield.....do	998 58	.....	998 58
North Harvey.....do	589 92	.....	589 92
Opeongo.....do	404 80	.....	404 80
Palmer Rapids.....do	507 13	.....	507 13

SUMMARY OF EXPENDITURE, ETC.—*Continued.*

NAME OF WORK.	Cash.	Supplies from Department.	Total.
EAST DIVISION.—*Continued.*	$ c.	$ c.	$ c.
Papineau, 12th and 13th concession ..Road	526 53	.....	526 53
Paudash Lake ..... do	501 09	.....	501 09
Pembroke and Mattawa..... do	886 86	.....	886 86
Pembroke and Algona ..... do	399 80	.....	399 80
Perrault Settlement... ..... do	495 81	.....	495 81
Perth ..... do	180 00	.....	180 00
Peterson ..... do	496 81	.....	496 81
Petewawa ..... do	204 50	.....	204 50
Petewawa and Alice ..... do	396 15	.....	396 15
Reid ..... do	418 94	.....	418 94
Rolph ..... do	400 02	.....	400 02
Rolph and Buchanan town line ..... do	400 00	.....	400 00
Ross and Bromley..... do	397 93	.....	397 93
Ryde ..... do	500 10	.....	500 10
Sharbot Lake..... Bridge	250 00	.....	250 00
Snake River..... do	431 85	.....	431 85
South Algona, 5th concession .....Road	515 36	.....	515 36
Stafford, 6th and 7th side line... ..... do	413 71	.....	413 71
Sturgeon Falls ..... do	1,364 61	226 26	1,590 87
Sudbury ..... do	2,195 68	398 58	2,594 26
Sudbury and Blezard ..... do	1,700 65	220 82	1,921 47
Sydenham and Bedford..... do	798 57	.....	798 57
Trout Lake Junction ..... do	800 56	.....	800 56
Waugh..... do	522 33	.....	522 33
Westmeath..... do	300 43	.....	300 43
Westmeath and Muskrat Lake ..... do	201 49	.....	201 49
Widdifield and Phelps ..... do	515 35	.....	515 35
Wilberforce ..... do	299 76	.....	299 76
Wilberforce, 18th concession..... do	257 00	.....	257 00
Wilberforce, 19th and 20th concession ..... do	362 75	.....	362 75
York River .....Bridge	826 37	.....	826 37
Young's Point .....Road	204 25	.....	204 25
	50,172 14	1,737 13	51,909 27
MUNICIPAL GRANTS.			
County of Victoria, Account of Mud Lake Bridge. $425 86	.....	.....	
Township of Smith, " Buckhorn Road..... . 200 00	.....	.....	
County of Peterborough, " " 100 00	.....	.....	
" " " Gannon's Narrows Road 100 00	.....	.....	
Township of Harvey, " " " 100 00	.....	.....	
J. J. Gartshore, " Monmouth Junc. " 200 00	.....	.....	
County of Peterborough, " Reid Road 100 00	.....	.....	
Township of Galway, " " 50 00	.....	.....	
County of Peterborough, " Young's Point Road.... 100 00	.....	.....	1,375 86
Total Departmental Expenditure, East Division..... ..	.....	.....	50,533 41

SUMMARY OF EXPENDITURE, ETC.—*Continued.*

RECAPITULATION.

	Total Expenditure.	Municipal Grants and Refunds.	Departmental Expenditure.
	$ c.	$ c.	$ c.
I. North Division	40,526 76	1,394 34	39,132 42
II. West Division	35,141 57		35,141 57
III. East Division	51,909 27	1,375 86	50,533 41
Total Departmental Expenditure			124,807 40

HENRY SMITH,
Superintendent Colonization Roads.

DEPARTMENT OF CROWN LANDS,
TORONTO, 31st December, 1890.

REPORT

OF THE

DEPARTMENT OF IMMIGRATION

FOR THE

PROVINCE OF ONTARIO,

FOR THE YEAR

1890.

PRINTED BY ORDER OF THE LEGISLATIVE ASSEMBLY.

TORONTO:
PRINTED BY WARWICK & SONS, 68 & 70 FRONT STREET WEST.
1891.

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REPORT

OF THE

COMMISSIONER OF IMMIGRATION

FOR THE YEAR ENDING 31ST DECEMBER,

1890.

To the Honourable SIR ALEXANDER CAMPBELL, K. C. M. G.,
Lieutenant-Governor of the Province of Ontario.

MAY IT PLEASE YOUR HONOUR :

The undersigned has the honour to submit the following Report on the operations of the Immigration Department for the twelve months ending the 31st December, 1890.

In 1890 as compared with 1889 there was a decrease of 3,961, and of 9,106 as compared with 1888, in the number of immigrants who remained in the Province of Ontario. This decrease is owing partly to the causes enumerated in our report of 1889, viz.: the continued improvement of trade in Britain, the high rate of ocean fares, and the competition of other colonies and countries for certain classes of labour. There has also been a considerable decrease in the number of passengers carried across the Atlantic by the three leading lines of steamers.

The immigrants, as in the previous year, were able, with very few exceptions, to pay their way to their respective destinations, where their labour was in demand, and they have been reported as exceptionally healthy and strong. Free passages from the British Isles are now given to a limited number of skilled artizans—masons, carpenters, bricklayers, moulders, blacksmiths, carriage builders—to the Cape of Good Hope ; and assisted passages to skilled mechanics to Natal, South West Africa ; and there is a prospect of fair emigration to other parts of Africa of the agricultural and other classes in the near future. This will no doubt absorb a considerable number of the mechanics who would otherwise come to Ontario.

The visit of the British farmer delegates during the autumn will no doubt be productive of substantial benefits. These gentlemen having been afforded ample opportunity to view the different sections of Ontario and see for themselves the actual condition of agriculture and the splendid opportunities for its further development, have been able to form an intelligent opinion of the resources and the capabilities of the Province, and some of them have already expressed in terms of unqualified approbation their appre-

ciation of the advantages which it offers to the skilled British farmer of moderate capital. When the reports of these gentlemen shall have been printed and distributed throughout Great Britain and Ireland the information thereby disseminated will tend to promote the emigration to this Province of a most desirable class of settlers.

Farm Labourers.

From the end of March till the end of October there was a very active demand for farm labourers at fair wages. This demand could only be partially supplied. Most of the men were engaged at the agencies, farmers coming to meet them on their arrival. This class is in great demand in other colonies. The government of Queensland grants single men under thirty-five years of age free passages from the British Islands to their destinations in Queensland, where they are paid from $175 to $225 per annum, with maintenance. This takes away farm labourers who would otherwise come to this Province. There are also many of this class going to Manitoba and the North-west by the C. P. Railway, *via* Nipissing, without stopping in Ontario.

Female Domestic Servants.

The immigration of this class has almost ceased. This is owing to the increased demand in the British Islands and colonies. There are free passages granted by the Queensland Government to cooks, laundresses, housemaids, nurses and general servants, wages ranging from $100 to $200 per annum, with board. Free passages are also granted to female domestic servants by the government of Natal, South West Africa. There is little or no prospect of an increase in the immigration of this class while the present rates of passage continue.

The following is a statement of the number of immigrants settled in the Province of Ontario, through the Ottawa, Kingston, Toronto, Hamilton and London agencies, with their nationalities, during the years 1878, 1879, 1880, 1881, 1882, 1883, 1884, 1885, 1886, 1887, 1888, 1889 and 1890 respectively:—

Year.	English.	Scotch.	Irish.	German.	Other Countries.	Total.
1878	6,124	1,785	1,551	620	2,975	13,055
1879	12,169	2,894	3,993	1,450	3,901	24,407
1880	7,980	3,027	4,518	1,197	2,569	19,291
1881	7,704	3,070	4,521	1,274	1,664	18,233
1882	10,873	3,173	6,322	1,033	1,290	22,691
1883	11,954	2,658	8,993	1,384	2,130	27,119
1884	11,020	2,623	3,783	1,716	3,136	22,277
1885	7,261	2,131	2,105	1,098	1,378	13,973
1886	8,344	2,268	2,497	936	1,243	15,288
1887	10,758	3,277	3,330	1,032	1,326	19,723
1888	11,984	3,598	2,801	993	1,156	20,532
1889	9,028	2,347	2,268	779	965	15,387
1890	6,442	1,613	1,630	699	1,042	11,426

The above table shews a decrease of 3,961 in 1890 as compared with 1889.

The total arrivals in and departures from Ontario in 1889 and 1890 respectively were as follows :—

	Via St. Lawrence.	United States.	Total Arrivals.	Passed through the Province.	Remained in Ontario.
1889	14,802	52,343	67,145	51,758	15,387
1890	10,234	44,030	54,264	42,838	11,426
Decrease in 1890					3,961

The immigrants settled in this Province during the years 1878, 1879, 1880, 1881, 1882, 1883, 1884, 1885, 1886, 1887, 1888, 1889 and 1890 were distributed through its respective agencies as follows :—

Year	Ottawa.	Kingston.	Toronto.	Hamilton.	London.	Total.
1878	416	746	4,602	6,348	943	13,055
1879	608	1,134	9,509	10,639	2,517	24,407
1880	767	1,363	7,094	8,241	1,826	19,291
1881	977	2,187	7,779	6,227	1,063	18,233
1882	2,248	5,473	8,404	5,363	1,201	22,691
1883	2,670	3,984	11,233	7,535	1,697	27,119
1884	3,033	3,195	7,229	7,176	1,643	22,277
1885	1,398	1,877	5,166	4,698	834	13,873
1886	1,072	2,173	6,045	4,705	1,293	15,288
1887	1,660	1,983	8,606	6,419	1,055	19,723
1888	1,238	1,972	9,430	6,358	1,534	20,532
1889	940	1,633	6,950	4,660	1,204	15,387
1890	708	899	5,070	4,008	741	11,426

In addition to the above immigrants, the following numbers were reported through the customs as having arrived and settled in Ontario :—

	1882.	1883.	1884.	1885.	1886.	1887.	1888.	1889.	1890.
Ottawa and Ports within its Agency.	1,133	1,123 1,395*	1,131 968*	1,020	1,150	944	1,168	932	926
Kingston do	958	1,001	939	855	673	629	725	832	657
Toronto do	1,546	1,622	426	1,593	1,709	1,736	2,057	2,757	1,978
Hamilton do	1,138	1,366	1,179	987	912	1,218	1,131	1,565	1,783
London do	6,740	6,868	6,674	2,642	2,735	1,493	1,609	1,723	1,717
Total	11,515	13,378	11,217	7,097	7,179	6,020	6,690	7,809	7,061

*Sent from Quebec to other places within the Ottawa Agency.

STATEMENT shewing the number of persons who arrived at the undermentioned Ports of Entry, with the value of their effects, from the United States, for settlement in the Province of Ontario, from the 1st January to 31st December, 1890.

PORT OF ENTRY.	Total reported.	NATIONALITIES.					SEXES.			Value of Effects.
		Canadians.	English.	Irish.	Scotch.	Other Countries.	Males.	Females	Children.	
Amherstburg	239	156	16	4	14	49	64	77	98	$7545 00
Belleville	78	66	.....	4	.....	8	20	25	33	3035 00
Bowmanville	15	10	.....	.....	.....	5	5	4	6	875 00
Brantford	101	85	9	2	.....	5	24	29	48	5488 00
Brighton	13	13	.....	.....	.....	.....	5	5	3	493 00
Brockville	158	109	7	6	6	30	45	73	40	8749 00
Chatham	333	249	22	5	7	50	95	100	138	12516 00
Clifton	152	60	27	3	3	59	55	55	42	12749 00
Cobourg	55	38	2	4	.....	11	19	20	16	6310 00
Colborne	35	14	1	6	.....	14	11	13	11	1052 00
Collingwood	52	32	5	8	1	6	20	15	17	1912 00
Cornwall	149	92	20	4	13	20	35	38	76	4755 00
Cramahe	7	7	.....	.....	.....	.....	3	2	2	695 00
Deseronto	36	33	.....	.....	.....	3	15	11	10	1615 00
Dover	184	135	8	11	9	18	50	58	76	8748 00
Dunnville	39	39	.....	.....	.....	.....	8	8	23	1080 00
Fort Erie	382	132	12	6	5	227	109	118	155	27291 00
Galt	68	47	1	.....	8	12	28	16	24	6437 00
Gananoque	63	44	2	.....	4	13	12	24	27	2699 00
Goderich	215	178	4	2	7	24	44	58	113	8935 00
Hamilton	588	243	86	19	42	198	159	216	213	48025 00

Kingston	272	178	36	.....	.....	58	60	92	120	14939 00
Lindsay	22	10	7	2	3	.... ..	6	7	9	449 00
London	311	164	54	28	13	52	88	98	125	21385 00
Morrisburg	52	32	... .	4	2	14	18	18	16	1945 00
Napanee	28	19	... ...	.....	.....	9	8	10	10	2612 60
Niagara	31	.....	5	6	10	10	6	9	16	1900 00
Oakville	17	10	.....	.....	....	7	3	4	10	925 00
Oshawa	20	16	2	2	.....	.....	3	7	10	1425 00
Ottawa	448	281	33	35	17	82	124	132	192	23478 00
Owen Sound	56	49	.....	.....	1	6	15	17	24	2218 00
Paris	17	14	3	.....	.....	.....	5	6	6	1090 00
Penetanguishene	15	15	.....	.. ....	.....	.....	4	2	9	220 00
Picton	26	25	.... ..	.... ..	.. ...	1	7	11	8	815 00
Port Arthur	30	2	1	.....	.... ..	27	12	8	10	1635 00
Port Hope	49	35	.....	.....	... .	14	15	16	18	2940 00
Prescott	119	75	1	2	....	41	31	38	50	4720 00
Saugeen	30	22	.....	... .	1	7	10	10	10	1690 00
Sault Ste. Marie	180	109	24	3	7	37	43	16	91	10407 00
Stratford	297	139	45	22	29	62	68	103	126	13879 00
St. Catharines	221	155	23	.....	2	41	58	74	89	11687 00
St. Thomas	162	95	10	2	6	49	46	56	60	11900 00
Toronto	1504	563	317	51	79	494	403	492	609	130618 00
Trenton	44	38	.....	.....	6	.. ..	11	12	21	3170 00
Whitby	18	8	10	....	.....	.....	8	6	4	2178 00
Woodstock	130	109	8	.....	.....	13	34	46	50	9215 00
	7061	3945	801	244	295	1776	1912	2285	2864	$448474 00

Total number of Immigrants and value of effects reported through the Customs, at the various Ports of Entry within the several agencies, for 1890.

PORTS OF ENTRY.	Total Reported.	Value of Effects.
		$ c.
Ottawa Agency	926	43,647 00
Kingston do	657	37,435 00
Toronto do	1,978	155.802 00
Hamilton do	1,783	124,495 00
London do	1,717	87,095 00
Total	7,061	448,474 00

Value of the effects of the Immigrants reported through Customs in the following year was:—

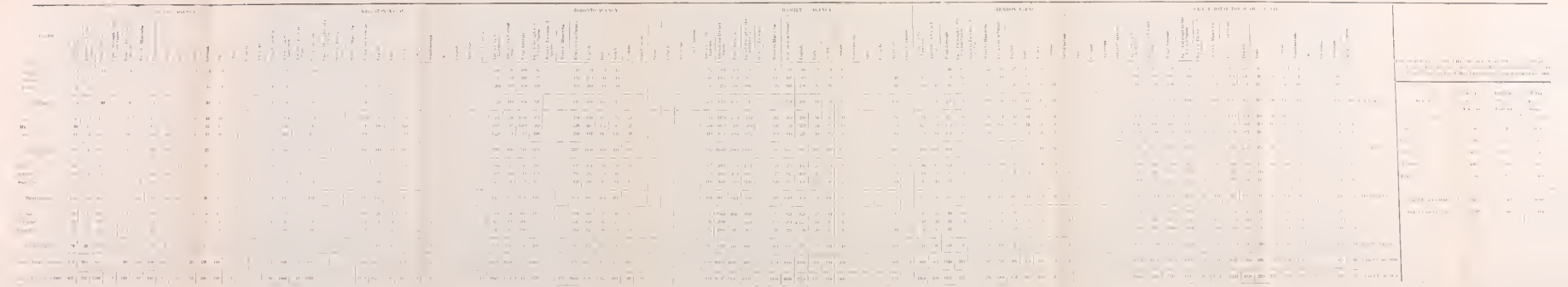
	1885.	1886.	1887.	1888.	1889.	1890.
Ottawa	$35,667	42,680	37,275 00	53,909 00	41,168	43,647
Kingston and ports within its Agency.	37,266	37,244	28,662 00	32,035 00	47,911	37,435
Toronto and ports within its Agency.	128,179	151,241	158,678 00	175,570 00	188,120	155,802
Hamilton and ports within its Agency.	56,961	58,709	79,312 00	80,520 00	110,118	124,495
London and ports within its Agency.	131,065	145,492	74,337 45	79,889 00	70,577	87,095
Total value	$389,138	$435,366	$378,264 45	$421,923 00	$457,894	$448,474
Total value in '84,'85, '86, '87, '88, '89.	410,424	389,138	435,366 00	378,264 45	421,923	457,894
Increase		$46,226		$43,658 55	$35,971	
Decrease	$11,286		$57,101 55			$ 9,420

...er, 1890.

AGENCIES.

	Scotch.	German.	Scandinavian.	Swiss.	Icelandic.
...730	57	22	4	.....	.....
...635	68	23	1	.....	.....
...207	95	60	14	.....	.....
...552	220	105	19	.....	.....
...806	144	119	29	.....	....
...459	315	102	15	.....	.....
...006	299	71	32	.....	...
...271	758	292	76	.....	....
...170	147	64	11	.....	.....
...634	125	61	18	.....	.....
...038	129	33	17	....	.....
...712	401	158	46	.....	....
...135	95	61	10	.....	....
...136	78	49	19	.....	... .
...054	61	34	4	.....	....
...435	234	144	33	...	....
...830	1613	699	174	.....	. ...
...038	2347	779	205	7	.....

STATEMENT A. Shewing the number of Immigrants arrived in Ontario and the number remained, with their Nationalities, for the twelve months ending 31st December, 1890.



The following statement shews the number of Immigrants who left the British Islands for places out of Europe, and the percentage settled in Ontario, through Agencies, during the years 1874, 1875, 1876, 1877, 1878, 1879, 1880, 1881, 1882, 1883, 1884, 1885, 1886, 1887, 1888, 1889 and 1890 respectively :—

Year.	Numbers Left.	Settled in Ontario.	Per centage.
1874.	241,014	25,254	10.55
1875.	173,809	17,655	10.16
1876.	138,222	11,432	8.27
1877.	119,971	11,654	9.77
1878.	147,663	13,055	8.84
1879.	217,163	24,407	11.23
1880.	332,294	19,291	5.80
1881.	392,514	18,233	4.64
1882.	413,288	22,691	5.49
1883.	397,157	27,119	6.83
1884.	304,074	22,277	7.32
1885.	264,986	13,973	5.27
1886.	330,881	15,288	4.62
1887.	396,494	19,723	4.97
1888.	398,494	20,532	5.16
1889.	342,641	15,387	4.49
1890.	....	11,426	....

The following statement shews the aggregate number of children settled in this Province since 1868 by the undermentioned parties.

Year.	Miss Rye.	Miss Macpherson.	Mrs. E. Bilbrough Wallace.	Mr. Middlemore.	Rev. Dr. Stephenson.	Dr. Barnardo.	Shaftesbury's Boys' Home, London, Eng.	Cardinal Manning and others.	Mr. Quarrier.	Total.
1868	5									5
1869	187									187
1870	253	194								447
1871	277	498								775
1872	185	321								506
1873	134	358		102						594
1874	193	279		50	81					603
1875		184		78	43					305
1876		163		71						234
1877	91	115		83	28					317
1878	42	68	79	86	32					307
1879	96	95	126	57	24					398
1880	68	114	129	41	22		11	22		407
1881	117	90	158	60	43		49	45		562
1882	118	183	153	70	41	51	24	139		779
1883	170	193	194	125	53	172	43	183		1133
1884	165	165	254	145	75	252	39	283		1378
1885	125	183	351	115	87	395	32	323		1611
1886	110	215	274	129	91	615	33	301		1768
1887	120	212	316	202	75	406		77		1408
1888	300	270	271	279	101	484	104	30		1839
1889	160	249	295	85	86	481	92			1448
1890	151	156	204		71	257	96		250	1185
Total	3067	4305	2804	1778	953	3113	523	1403	250	18196

EXPENDITURE.

The total expenditure on account of Immigrati n during the years 1885, 1886, 1887, 1888, 1889, and 1890, respectively, was as follows :

——	1885.	1886.	1887.	1888.	1889.	1890.
	$ c.	$ c.	$ c.	$ c.	$ c.	$ c.
Agencies in Europe.....	5150 00	5150 00	5150 00	5150 00	3889 00	3870 50
Agencies in Canada.....	4964 63	4224 35	2485 22	550 00	648 00	600 00
Carriage of Immigrants in Ontario	2852 74	780 58	809 34	328 55	236 63	114 49
Provisions for Immigrants, including medical attendance	2959 16	2527 64	2948 31	638 78	423 97	196 66
Incidentals	623 48	872 98	403 07	485 06	474 82	777 33
Immigration Pamphlet and Maps	2538 10	3281 85	... .	800 00	1177 48	27 00
Total	19088 11	16837 40	11795 94	7952 39	6849 90	5585 98
Cost per head, including Immigrants settled through Agencies only..	1.36	1.10	.59	.38	.44	.48

The following statement, condensed from the Reports of the Commissioner of Crown Lands, shews the progress of the settlement of the Free Grant Districts since 1868 :

YEAR.	Number of Townships set apart.	Number of persons located.	Number of acres located.	Number of purchasers.	Number of acres sold.	Number of lots, the location of which have been cancelled.	Number of patents issued.
1868.....	15	511	46336	82	2120	....	.....
1869.....	24	566	56011	52	956	....	....
1870.....	14	1200	155427½	148	4585½	.....	.....
1871.....	1	1113	153105½	139	3452½	.....	.....
1872.....	18	875	115065	97	2268½	148	.....
1873.....	6	757	100603½	79	5038	381	.....
1874.....	10	919	119070	57	2144	453	755
1875.....	1	1387	186807	89	3896	381	570

STATEMENT of settlements in Free Grant Districts, etc.—*Continued.*

YEAR.	Number of Townships set apart.	Number of persons located.	Number of acres located.	Number of purchasers.	Number of acres sold.	Number of lots, the locations of which have been cancelled.	Number of patents issued.
1876	.....	463	192858	110	2261	462	546
1877	4	1914	260801	149	5534	691	542
1878	1	2115	274238	188	6637	1118	472
1879	.....	1506	199500	125	4911	1018	513
1880	23	1292	181745	110	3621	870	487
1881	5	1077	153764	155	8870	781	487
1882	1	932	129535	150	5562	624	502
1883	1	985	134594	143	8927	587	790
1884	3	1157	161964	125	5809	635	609
1885	2	1236	175351	149	5998	563	581
1886	.....	1149	162734	133	5474	607	706
1887	4	902	122772	109	5694	612	559
1888	.....	842	109002	74	2797	556	523
1889	20	858	114050	84	3708	657	386
1890	1	610	83273	53	2345	575	456
Total	254	25366	3388606½	2598	102608½	11419	9474

STATEMENT shewing the number of Immigrants settled in Ontario, through Agencies, and reported through Customs, from 1868 to 1890.

YEAR.	Number settled through Agencies.	Number reported through Customs.	Total number settled.	Value of the effects of Immigrants reported through Customs.
1868			10873	No returns reported.
1869			15893	"
1870			25590	"
1871			25842	"
1872			38129	"
1873			39184	"
1874	25444	6276	31720	Returns not complete.
1875	17655	4096	21751	$328236 00
1876	11432	7691	19123	279138 00
1877	11654	6225	17879	305662 00
1878	13055	4885	17940	311117 00
1879	24407	4420	28827	244618 00
1880	19291	5435	24726	258919 00
1881	18233	6967	25200	313075 00
1882	22691	11515	34206	503032 00
1883	27119	13375	40494	533295 00
1884	22277	11217	33494	405770 00
1885	13973	7079	21052	389138 00
1886	15288	7179	22467	435364 00
1887	19723	6021	25744	378264 45
1888	20532	6690	27222	421923 00
1889	15387	7809	23196	457894 00
1890	11426	7061	18487	448474 00
Total	309587	123941	579039	$6014929 45

Further details will be found in the various appendices to this Report.

All of which is respectfully submitted.

JOHN DRYDEN,
Commissioner.

TORONTO, January, 1891.

APPENDICES.

No. 1.

ANNUAL REPORT OF PETER BYRNE, ESQ., IMMIGRATION AGENT, LIVERPOOL, ENGLAND.

ONTARIO GOVERNMENT AGENCY,
NOTTINGHAM BUILDINGS, 19 BRUNSWICK STREET,
LIVERPOOL, 31st December, 1890.

THE HON. JOHN DRYDEN,
Minister of Agriculture and Immigration,
Toronto.

SIR,—I have the honour to report that the work of this agency during 1890 has been carried on in substantially the same manner as in previous years. The main purpose I have kept constantly in view has been to make known as widely as possible, and by every means at my command, the great and varied resources of our Province and the attractions it offers to tenant farmers and others with capital to invest in improved farm property, and in manufacturing and mining enterprises; also to persons of limited but independent incomes who have families to educate and to set up in life. The principal means used to this end are advertising and the distribution of pamphlets and other printed matter. I have advertised to a limited extent in all the principal agricultural papers in order to reach the important class of tenant farmers; also in many general newspapers having a large circulation in rural districts. The advertisements are necessarily very brief owing to the wide extent of ground to be covered and the limited amount at my disposal for this purpose. They simply announce that our pamphlet, "Ontario as a Home for the British Tenant Farmer who desires to become His Own Landlord," with coloured map of the Province, can be had free on application to our agency.

All applications for the pamphlet are promptly responded to with an intimation by letter that I shall be glad to answer any special enquiries which the recipient may desire to make. In many cases further correspondence ensues, when additional printed matter is sent either for the applicant himself or for some friend or neighbor.

Besides the pamphlets, etc., thus sent by mail, I have personally, and with the help and co-operation of many country agents, distributed a large quantity at agricultural shows, fairs and emigration meetings in various parts of the agricultural districts.

By way of economising the pamphlet supply, I prepared early in the year a four-page leaflet giving a summary of the principal facts regarding the Province. Of this leaflet I have had about 50,000 printed, of which 20,000 were in the Welsh language for special circulation in the Principality, in the rural portions of which the inhabitants read and speak their native tongue almost exclusively. The bulk of these leaflets has been already scattered very widely.

During the year I have taken part in upwards of twenty public meetings where lectures and addresses were delivered on Canada as a field for emigration. The lectures were illustrated with excellent lime-light pictures of Canadian scenery, including a capital series of views showing many interesting features of the social and industrial life of Ontario, which I procured last year from a photographer just returned from a visit to the Province. They are just the right sort for an old country agricultural audience who want to know all about the settler's home and its surroundings—the kind of stock he keeps, the sort of implements and vehicles he uses, the kinds of crops he raises, etc., etc. I would like to obtain a great many more of such pictures, and Mr. Spence has kindly promised to try to get them for me. The optical lantern, with the

recent improvements in the methods of illumination, has become a powerful and attractive means of popular instruction and entertainment, there being hardly a subject lectured upon now-a-days in this country that is not made doubly interesting by its means. This is emphatically true of the subject of emigration.

The interesting and comprehensive report of the Royal Commission on mining, of which a considerable number of copies have been sent me for distribution, has supplied a long felt want. I have often been applied to for information regarding the mining operations and mineral wealth of Ontario, but was unable until the receipt of this report to give anything more than the most meagre and general replies to such inquiries. But this report is itself a rich mine of facts of the greatest value and importance to all interested in mining enterprise. I have already sent a number of copies to the free libraries of some of the principal cities. The remainder I am reserving to be placed, as opportunity arises, only where they will be likely to be used to the advantage of the Province.

The pamphlet on the Rainy River District, of which I have received a few advance copies, will also prove a welcome addition to my stock of emigration literature.

The brief description of that section of the Province given in the general pamphlet, "Ontario as a Home, etc.," has excited a good deal of interest among the emigrating public, judging by the frequent inquiries I have received regarding it. To these inquiries I have hitherto not been able to give any satisfactory replies owing to the lack of that information, which is happily furnished by the new publication.

The visit of the agricultural delegates to the Dominion during the past autumn has excited a great deal of attention in all parts of the United Kingdom, and their reports which are expected to be issued very soon, are being looked forward to with the greatest interest. The press devoted hundreds of notices to the object of their appointment and will doubtless teem with articles setting forth the salient points in their several reports which, from a conversation with some of the delegates on their return, I am glad to say are likely to prove of great benefit to the Dominion at large by advertising on the grandest scale its strong claims to the attention of intending emigrants of the agricultural and other classes.

Our own Province is certain to receive its due share of attention in the reports, of which a very large edition will doubtless be printed for free circulation in the United Kingdom. Some of the more important paragraphs specially relating to Ontario might be printed in a separate leaflet with a view to much wider diffusion of the information they contain than could be attained by the comparatively bulky pamphlet.

The unfortunate Benwell tragedy excited much feeling and called forth many comments of the press in this country as well as in Canada during the year. Much was said in condemnation of what is known as the "farm pupil" system.

With reference to this subject I may state that when applied to by young men or their friends for advice as to the payment of premiums, I invariably caution them against having anything to do with such schemes. Any further advice I give them is determined as far as possible by a knowledge of their character and antecedents.

If I have proof or reason to believe that these are good and that they are really anxious to engage in farming and seem fit for it, I give them all the assistance in my power, provided always that they possess sufficient means to support themselves, if necessary, till they find suitable situations. If otherwise, I dissuade them from emigrating at all.

Experienced farm labourers of good character I encourage all I can, believing that they are a valuable class of settlers; especially married men with families. In my travels through the rural districts I meet great numbers of these men who would gladly go out to Ontario if they could raise the means to take them.

Regarding that other important class of emigrants, namely, female domestic servants, the number inclined to emigrate continues to be small compared with the demand for them in every part of Canada; and until there is a large increase in the emigration of

families, the deficiency in the supply of domestics is likely to continue. Girls will naturally go with their parents and their families ; but seeing that good servants are also in great demand here as well as in Ontario, only special inducements such as free passage will prevail on them to emigrate alone.

By the following returns of the number of passengers carried to Canada during 1890 by the Allan, Dominion and Beaver Lines of steamers, it will be seen that there is a considerable decline as compared with the preceding year :—

	1890.	1889.
Allan Line	29,905	35,428.
Dominion Line	7,360	8,914.
Beaver Line	5,596	6,491.

No 2.

ANNUAL REPORT OF E. M. CLAY, ESQ., DOMINION IMMIGRATION AGENT, HALIFAX, NOVA SCOTIA.

Dominion Government Immigration Agency,
Intercolonial Railway Station,
Halifax, Nova Scotia, Jan. 27th, 1891.

Dear Sir,—I have the honour to submit for your information a report of the Immigration at this agency for the year 1890.

The arrivals for the year have been :—

Cabin.

Males	3,172	
Females	2,451	
Children	245	
		5,868

Steerage.

Males	5,817	
Females	2,180	
Children	1,440	
		9,438
Grand total		15,305

Showing a decrease in cabin of 759, in steerage 2,891, and a total decrease of 3,650.

While we have not had as large an immigration as we had hoped for, yet the superior class of people arriving has been sufficiet to over-balance the decrease from former years. Farmers with money and young men with lots of push have formed the larger part of the immigrants the past year, but still there is room for more.

You will see by statement enclosed that 757 of the Immigrants who landed here during the year have gone into your Province.

During the year eight parties of children landed here as per statement enclosed.

Our farmers have experienced another fairly good year. While some crops have turned out poorly, others have made up the loss, thus on the whole a fairly good yield has been obtained.

Trusting that the above will prove satisfactory,

I have the honor to be, Sir,
Your obedient Servant,

EDWIN M. CLAY,
Dominion Government Immigration Agent.

D. Spence, Esq.
Secretary Ontario Immigration Department,
Toronto, Ontario.

YEARLY RETURN of Cabin Arrivals and Departures at Halifax, Nova Scotia, Immigration Agency, for the year 1890.

	ADULTS, 12 YEARS AND OVER.		UNDER 12 YEARS.		TOTAL SOULS.	NATIONALITIES.										
	Male.	Female.	Male.	Female.		English.	Irish.	Scotch.	Germans.	Scandinavians.	French and Belgians.	U. S. Citizens.	Canadians.	Chinese.	Other countries.	Total.
Via Ocean Travel.....	3172	2451	158	87	5868	1373	...	12	....	.....	16	4460	....	....	....	5861
Via United States.....	.....	.....	.....	.....	.....	7	....	....	....	.....	.....	.....	....	....	....	.....
Total	3172	2451	158	87	5868	....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....

4

TRADES OR OCCUPATIONS.								DECLARED DESTINATIONS.										ARRIVALS.	
								LOWER PROVINCES.											
Farmers.	Farm labourers.	General labourers.	Mechanics.	Clerks, Traders, etc.	Female servants.	Not classified.	Total.	Nova Scotia.	New Brunswick.	Prince Edward Island.	Quebec.	Ontario.	Manitoba.	North-West Territories.	British Columbia.	United States.	Total.		
																		Not reported elsewhere :	
																		For Canada	5861
																		For United States	7
																		Reported elsewhere :	
																		For Canada	.....
																		For United States	.....
... .	.....	.....	.....	.....	.....	5861	5861	4997	159	34	167	269	125	51	59	7	5868		
.....	.....	. ...	.....	.....	.....	7	7	....	.....	.....	.....	.....	.....	.....	.....	....	.....	Total	5868

EDWIN M. CLAY, *Agent.*

YEARLY RETURN of Immigrant Arrivals and Departures at Halifax, Nova Scotia, Immigration Agency, for the year 1890.

	ADULTS, 12 YEARS AND OVER.		UNDER 12 YEARS.		TOTAL SOULS.	NATIONALITIES.										
	Male.	Female.	Male.	Female.		English.	Irish.	Scotch.	Germans.	Scandinavians.	French and Belgians.	U.S. Citizens.	Canadians.	Chinese.	Other Countries.	Total.
Via Ocean Travel.....	5817	2180	896	544	9437	4857	241	560	240	308	201	839	....	....	129	7375
Via United States.....	.....	.....	.....	.....	.....	1095	18	28	309	328	116	.....	....	....	168	2062
Total	5817	2180	896	544	9437	.....	....	....	....	.....	.....	....	....	....	....	.....

TRADES OR OCCUPATIONS.								DECLARED DESTINATIONS.									ARRIVALS.	
								LOWER PROVINCES.										
Farmers.	Farm labourers.	General labourers.	Mechanics.	Clerks, Traders, etc.	Female servants.	Not classified.	Total.	Nova Scotia.	New Brunswick.	Prince Edward Island.	Quebec.	Ontario.	Manitoba.	North-West Territories.	British Columbia.	United States.	Total.	
																		Not reported elsewhere :
																		For Canada 7375
																		For United States..... 2062
																		Reported elsewhere :
																		For Canada ....
																		For United States . ...
223	161	3315	557	157	857	2105	7375	2186	484	108	757	1928	1197	396	319	2062	9437	Total 9437
28	37	1217	111	11	237	421	2062	.....	.....	.....	.....	.....	.....	.....	...	.....	.....	

EDWIN M. CLAY, *Agent.*

STATEMENT shewing number of Children landed at this Agency during year 1890.

STEAMERS.	Date of Arrival.	By whom Sent.	No. of Children.		Where Bound.
			M.	F.	
Parisian	March 28	Mrs. Birt	41	.....	Knowlton, P. Q.
"	" 28	Miss Macpherson	47	.....	Stratford.
Sarnia	April 4	Dr. Stephenson	60	.....	Hamilton and Manitoba.
"	" 4	Mr. Fegan	96	.....	Toronto.
"	" 4	R. Wallace	107	8	Belleville.
Parisian	" 6	Dr. Barnardo	39	.....	Russell, Man.
Siberian	" 10	Mr. Quarrier	122	.....	Brockville.
Canadian	Oct 5	Mrs. Cameron	.....	19	St. John's, N. B.
Total	.....	.....	512	27	

EDWIN M. CLAY,
Dominion Government Immigration Agent.

No. 3.

ANNUAL REPORT OF R. MACPHERSON, ESQ., DOMINION IMMIGRATION AGENT, KINGSTON, ONTARIO.

GOVERNMENT IMMIGRATION OFFICE,
KINGSTON, 31st December, 1890.

SIR,—I have the honour to present my annual report shewing the arrivals of immigrants at this Agency for the twelve months ending 31st December, 1890, and their nationalities.

The number of settlers from the United States who have made entry at the several ports of entry within my district during the past year are not included in the statement herewith enclosed.

The demand for labourers, both farm and general, during the past year far exceeded the supply and many more than came to me could have been placed at good wages; the same may be said in regard to female domestic servants and I trust that very many more of both farm labourers and female servants may come under my care during 1891.

There was but little sickness among the immigrants who arrived in this district during the year now closed and not any of a serious nature, their health having been exceptionally good.

The farmers in the district are paying more attention to stock raising and very many fine barns are erected with stone foundations for stabling horses and cattle where they are protected from the cold storms of winter and consequently come out in better condition in the spring season. The manufacture of cheese is largely on the increase, and the poultry product is being more carefully looked after. The exportation of fowl and eggs has attained large magnitude.

All of which is respectfully submitted.

I have the honor to be, Sir,
Your obedient servant,

R. MACPHERSON,
Government Immigration Agent.

The Honourable
THE COMMISSIONER OF IMMIGRATION.
Toronto.

KINGSTON AGENCY.

STATEMENT shewing the number of Immigrant arrivals and departures at this Agency for the twelve months ending 31st December, 1890, and their nationalties, the number of free meals and free passes by railway, or other conveyances, from this Agency to their respective places of destination.

MONTHS.	Number of arrivals *via* the St. Lawrence and Halfax.	Number of arrivals *via* the United States.	Total Number of Souls.	Went to the United States.	Went to Province of Quebec.	Went to Manitoba.	Remained in the Province of Ontario.	NATIONALITIES OF IMMIGRANTS SETTLED IN ONTARIO.									Number of free meals.	Number of Immigrants fed.	Number of free lodgings.	Number of free passes.
								English.	Irish.	Scotch.	German.	Scandinavian.	Swiss.	Icelandic.	American.	Other Countries.				
January	13	.....	13	....	....	....	13	9	2	2	....	....	....	....	....	.....	....	....	....	....
February	15	.....	15	....	....	....	15	10	1	4	....	....	....	....	....	.....	....	....	....	....
March	17	.....	17	....	....	....	17	12	3	2	....	....	....	....	....	.....	....	....	....	....
April	254	.....	254	....	....	....	254	249	4	1	....	....	....	....	....	.....	....	....	....	....
May	246	.....	246	....	....	....	246	108	5	133	....	....	....	....	....	.....	....	....	....	....
June	105	.....	105	....	....	....	105	87	5	13	....	....	....	....	....	.....	....	....	....	....
July	66	.....	66	....	....	....	66	57	5	4	....	....	....	....	....	.....	....	....	....	....
August	71	1	72	....	....	....	72	51	13	8	....	....	....	....	....	.....	....	....	....	....
September	54	.....	54	....	....	....	54	42	5	7	....	....	....	....	....	.....	....	....	....	....
October	25	.....	25	....	....	....	25	20	3	2	....	....	....	....	....	.....	....	....	....	....
November	21	.....	21	....	....	....	21	14	3	2	....	2	....	....	....	.....	....	....	....	....
December	11	.....	11	....	....	....	11	8	2	1	....	....	....	....	....	.....	....	....	....	....
	898	1	899	....	....	....	899	667	51	179	....	2	....	....	....	.....	....	....	....	....

(Signed,) R. MACPHERSON,
Agent.

KINGSTON, 31st December, 1890.

No. 4.

ANNUAL REPORT OF JOHN A. DONALDSON, ESQ., DOMINION IMMIGRATION AGENT, TORONTO, ONTARIO.

GOVERNMENT IMMIGRATION OFFICE,
TORONTO, 31st December, 1890.

SIR.—I have the honour to submit this, my thirtieth annual report, showing the work of this agency, for the year ending 31st December, 1890.

The number of arrivals here during that period, was as follows :—

Total number of immigrants arriving and passing through here, 7,573.

Of these, 6,534 came by way of Halifax, Montreal, and Quebec, and 1,039 by way of the different ports of the United States.

The total number of immigrants remaining in Ontario, and dealt with at this agency, were 5,070, a decrease of 1,880 from the numbers reported last year. This is partly to be accounted for by the brisk state of trade in England during the past summer ; and also by the inducements held out by other colonies. A large falling off in immigration is reported from the United States, so that Ontario is not alone in the decrease.

The route to the Western States from Quebec, *via* Sudbury and Sault Ste. Marie now being open, has taken a great number of the through passengers, who were formerly counted at this agency, which in a measure accounts for the reduced numbers reported passing through.

The demand for agricultural labourers during the season has been in excess of the supply, and especially during the early part of the year. Wages ranged from $15 to $28 per month for the summer season, and from $120 to $160 for the year.

The demand for domestic help, as usual, was far in excess of the supply. Though the tables appended shew 104 of this class arriving, yet the majority of these were on their way to join friends, so that we find it altogether impossible to supply the ever increasing demand for domestic servants. The country parts are even worse off than the cities in this respect, as but very few domestics seem to care to take service in the country.

The immigrants arriving this year have been of an excellent class, and, with very few exceptions, have come provided with sufficient funds to keep themselves until employment offers.

The vast deposits of valuable metals, silver, copper, iron, etc., found in the vicinity of Sudbury during the past few years has turned the attention of capitalists in England and the United States to that part of the Province, and now the discovery of nickel there, which but a short time ago was supposed to be an extremely rare product of nature, will prove that Canada is one of the richest countries in minerals on the face of the globe. A large delegation of the members of the Iron and Steel Institute visited these mines in October, and were surprised beyond measure at the vastness of our mineral resources, and especially the deposit of nickel, which bids fair to become a competitor of iron in the manufactures of the world. In the Province of Ontario this mineral is found in sufficient quantities to satisfy the needs of the coming ages, and the future in store for Canada through this discovery alone can be better imagined than described.

Our exportation of cattle, sheep, etc., has now reached gigantic proportions. Thirteen years ago, in 1877, when the business of shipping live cattle to Great Britain was considered to be an established fact, the number exported from the port of Montreal was 6,940 head. The next year it had reached 9,000 head, and during the season just closed, the exports from Montreal have reached 123,627 head, being 37,959 over last year, and the largest of any previous year.

The visit of the British Farm Delegates is a move in the right direction, and there is little doubt but it will result in a large accession to our population of tenant farmers and men of capital. On account of the lateness of the season when they arrived, they

could spare but little time, after going through the North-west, to visit Ontario, yet what they did see left an excellent impression, and one and all spoke in the highest terms of the country, and their report is looked forward to with no little degree of interest.

The Toronto Industrial Exhibition held here this fall was an immense success, and the show of horses, cattle and sheep there was pronounced by those who were well able to judge equal to any in England. Among other distinguished visitors were Lord Stanley, Sir Henry Tyler, and the Right Hon. the Earl of Aberdeen. The latter has been making a tour of the country during his short visit, and with the others expressed the greatest surprise at all that he saw. On his return to Scotland his opinion will have a great deal of weight in inducing a good class of immigrants to make Canada their home.

Numerous public and other buildings are in course of construction, which will both adorn the city and find employment for working men. Among them may be noticed the Parliament Buildings, City Hall, Board of Trade Building, and the Canadian Life Building, and it is expected during the coming year that the Canadian Pacific Railway will spend an immense sum in the improvement of the Esplanade and building a new station.

In the crops we have had a fair average yield. The averages of spring wheat, oats, peas, corn, buckwheat and beans are greater than their respective averages of the nine years 1882-90, while those of fall wheat, barley and rye are less. The average and aggregate yield of the root crops are greater than their annual averages for the nine years, and in yield per acre, the potato crop alone is under the average, due to the excessive wet season, and the quality of the tuber has also suffered from the same cause.

The general health of the immigrants arriving, has been very good, and no deaths have occurred during the year.

Every possible kindness and attention has been shown by the employees of the railway companies to the immigrants on their way up from the port of landing to their destination, and no complaints of incivility or inattention have reached this office.

I have the honour to be, Sir,
Your obedient servant,

J. A. DONALDSON.

David Spence, Esq.,
Secretary, Department of Immigration,
Toronto.

STATEMENT shewing the number and destination of Immigrants forwarded from this Agency by free passes for the twelve months ending, December 31st, 1890.

STATIONS.	Adult passes.	STATIONS.	Adult passes.
Bellwood	2	Komoka	1
Bowmanville	1	Lisgar	1
Bradford	1	London	2
Brampton	3	Malton	2
Brantford	1	Milton	2
Brockville	1	Niagara Falls	1
Burketon	1	Norwich	1
Caledon	1	Oakville	2
Campbell's Cross	1	Paris	10
Cannington	1	Port Dalhousie	2
Cheltenham	1	Port Perry	1
Downsview	1	Renton	2
Essex Centre	1	Shelburne	1
Galt	1	Springfield	1
Garnet	4	Sturgeon Bay	1
Gravenhurst	1	Stratford	1
Guelph	1	Streetsville	1
Hagersville	2	St. Catharines	2½
Hamilton	4	Thorold	1
Harriston	2	Utterson	4½
Holstein	1		
Inglewood	3	Total	76
Kinmount	1		

J. A. DONALDSON,
Immigration Agent.

STATEMENT shewing the number of Immigrant arrivals and departures at this Agency for the twelve months ending December 31st, 1890, and their Nationalities, the number of free meals and free passes by railways, or other conveyances from this Agency to their respective places of destination.

MONTHS.	Number of arrivals via the St. Lawrence and Halifax.	Number of arrivals via the United States.	Total number of souls.	Went to the United States.	Went to Province of Quebec.	Went to Manitoba.	Remained in the Province of Ontario.	NATIONALITIES OF IMMIGRANTS SETTLED IN ONTARIO.									Number of Free Meals.	Number of Immigrants fed.	Number of Free Lodgings.	Number of Free Passes.
								English.	Irish.	Scotch.	German.	Scandinavian.	Swiss.	Icelandic.	American.	Other Countries.				
January	142	46	188	45	.....	.....	143	99	32	12	.....	.....	.....	.....	.....	.....	20	..	.....	4
February	117	113	230	77	.....	.....	153	110	24	19	.....	.....	.....	.....	.....	.....	35	.....	.....	5
March	263	155	418	104	.....	.....	314	209	61	44	.....	.....	.....	.....	.....	.....	18	.....	.....	9
April	992	228	1220	452	.....	.....	768	558	111	75	24	.....	.....	.....	.....	.....	162	.....	.....	12½
May	1115	87	1202	482	.....	.....	720	450	162	83	25	.....	.....	.....	.....	.....	221	.....	.....	10
June	1228	91	1319	520	.....	.....	799	442	146	191	20	.....	.....	.....	.....	.....	194	.....	.....	12½
July	881	55	936	291	.....	.....	645	454	114	59	18	.....	.....	.....	.....	.....	17	.....	.....	7
August	487	62	549	158	.....	.....	391	282	59	41	9	.....	.....	.....	.....	.....	28	.....	.....	5
September	557	36	593	165	.....	.....	428	266	89	61	12	.....	.....	.....	.....	.....	40	.....	.....	4
October	388	58	446	112	.....	.....	334	194	97	31	12	.....	.....	.....	.....	.....	10	.....	.....	1
November	221	63	284	58	.....	.....	226	158	42	26	.....	.....	.....	.....	.....	.....	19	.....	.....	3
December	143	45	188	39	.....	.....	149	105	31	9	4	.....	.....	.....	.....	.....	29	.....	.....	3
Total	6534	1039	7573	2503	.....	.....	5070	3327	968	651	124	.....	.....	.....	.....	.....	793	.....	.....	76

(Signed), J. A. DONALDSON, Agent.

No. 5.

ANNUAL REPORT OF JOHN SMITH, ESQ., DOMINION IMMIGRATION AGENT, HAMILTON, ONTARIO.

Immigration Office,
Hamilton, Ontario, December 31, 1890.

Sir,—I have the honour to submit the following annual report, with tabular statements, shewing the arrivals and departures of immigrants at this agency for the year ending the 31st day of December, 1890.

The past year shows a decrease of 506 immigrants settled in Ontario as compared with the corresponding period of the previous year.

There is an increase of 376 immigrants passing through to Manitoba and the North-West Territories from the ports of New York, Boston and Philadelphia, the New England States, and the States of New York and Pennsylvania.

There is a decrease of 7,946 immigrants passing through Canada from the United States Atlantic ports to the Western States.

Statement A shews the arrivals and departures of immigrants, their declared destinations, nationalities and occupations.

Statement B shews the arrivals and departures of immigrants and their general destination.

Statement C shews the monthly arrivals of immigrants *via* the St. Lawrence and settling in Ontario.

Statement D shews the monthly arrival of immigrants *via* the United States settling in the Dominion and those passing through to Western States.

Statement E shews the number of children brought into and settled in the Hamilton district by the philanthropic societies.

Statement F shews the amount of capital reported brought into Canada.

Statement G shews the number of immigrants settled in Canada and their destination.

Statements H, I, J, K, and *L* shew the number of immigrants and the value of their effects as reported by the respective customs ports of entry.

Statement M shows the total number of immigrants and the value of their effects as reported by the respective customs ports of entry.

Statement N shews the rate of wages paid in the district of the Hamilton agency.

Statement O shews the prices of the different articles of food and wearing apparel.

The immigrants arriving at this agency during the past year compare very favorably with any previous year, the whole of them, with one or two exceptions, being very healthy and entirely free from pauperism.

The mechanics arriving here and reporting themselves at this agency numbered 69, all of whom met with employment.

The majority of the immigrants arriving this year were of the labouring class, including farm labourers, common labourers and those connected with the building trade and iron industries, with their wives and families, who readily found employment, the boys and girls being sought after for farm work and domestic service, the immigrants being a class of good settlers, and well adapted to the wants of the country.

There has been a falling off of enquiries for young men to learn farming during the year.

The past year has been free from strikes, with the exception of the cotton mill weavers; other wage earners have been engaged at full scale prices.

During the year there has been a good demand at this agency for all immigrants, who were engaged at fair wages immediately on their arrival. The demand for labour being in excess of the supply.

Agricultural Labour.

During the year there has been a good demand for young men, also for married men and their families. Men accustomed to the management of cattle are more eagerly sought after than formerly. Wages have been well maintained, running for first-class hands from $150.00 to $175.00 per annum, and as high as $200 00; the rate per month for good hands from $12.00 to $18.00, and for summer hands $20.00; harvest wages $20.00 to $30.00 by the month, including board and lodging.

Female Domestic Servants.

The demand continues to be in excess of the supply, girls being eagerly sought after. Wages run from $8 to $15 for general servants. Cooks command from $15 to $20.

Mechanics.

The number arriving this year are about the same as last; those arriving finding employment. At the present time there is no demand for this class of labour.

Mill Operatives.

Some of the mills have been shut down and run on short time. Others have been closed by the weavers striking. At present there is no demand for textile artizans.

Manufacturer's Operatives.

During the year there has been a fair demand, especially in the ready-made clothing business.

Common and Skilled Labourers.

There has been a fair demand for all able-bodied men to work in the foundries, rolling mills. railways, public works and the building trades.

Juvenile Immigration.

The societies engaged in juvenile immigration whose homes are located in the Hamilton district and referred to in Statement II. show a decrease of 100 as compared with the previous year.

The children arrived this year have been carefully selected and compare favourably with those brought out in any previous year.

The superintendents and matrons have been very successful in securing desirable homes for the children.

A number of these children are depositors in the savings bank, some of them connected with the Stevenson House having taken up homesteads in Manitoba and the North-west Territories. At the present time the children connected with this institution have one hundred and fifty-five individual bank accounts, the Hon. W. E. Sanford being the president, to whom a great deal of the success is due, assisted by the superintendent, Mr. Sanford Evans.

Most of the societies engaged in bringing out adult emigrants are well organized, more care being taken in the selections, before granting assistance; most of them having made ample provisions for the care of their immigrants on arrival until such time as they are placed in a position to provide for themselves. The Self Help Emigration Society, the Charity Organization Society, the Church Emigration Society, the East End Emigration Fund and the Northumberland Village Homes make remittances to defray any expenses incurred on their behalf.

During the past year there has been a large correspondence asking for maps, pamphlets and general information in reference to free grant lands in Ontario, Manitoba, British Columbia and the North-west Territories, also for information respecting the rate of wages, the cost of living and employment.

The number of communications received and dispatched numbered 7,226, being an increase of 1,047 over the previous year.

The outlook for the current year would indicate an active demand for both common, skilled and agricultural labourers, also for female domestic servants.

In my inspection of the children brought out to Canada by the different philanthropic societies I find, with a very few exceptions, that they have have been well selected and will compare favourably with the native children of the Province; having been placed in good homes, they will grow up to be useful members of the country.

I have the honour to be,
Sir,
Your obedient servant,

JOHN SMITH,
Immigration Agent.

The Honourable,
The Minister of Agriculture, Toronto.

STATEMENT A.—Arrivals and departures from the Hamilton

MONTHS.	ARRIVALS.			SEXES.			Total number of Souls.	DECLARED DESTINATIONS.						
	Via ocean travel.	*Via* United States.	From other parts of Canada.	Male adults.	Female adults.	Children under 12 years.		Lower Provinces.	Quebec.	Ontario.	Manitoba.	North-West Territory.	British Columbia.	United States.
January	77	334	....	232	73	156	461	....	....	210	65	....	....	186
February	66	1097	....	583	190	390	1163	....	....	206	105	....	....	852
March	96	3210	....	1654	548	1104	3306	....	....	285	116	....	....	3905
April	219	7579	....	3903	1297	2598	7798	.	....	479	207	...	....	7112
May	250	8852	....	4555	1545	3032	9102	....	....	512	191	....	....	8399
June	213	4071	....	2146	712	1426	4284	....	...	444	168	....	....	3672
July	167	2061	....	1118	370	740	2228	....	....	370	121	....	....	1737
August	129	2925	....	1531	508	1015	3054	....	....	345	177	....	....	2532
September	108	3081	. ..	1598	531	1060	3189	....	....	328	120	....	....	2741
October	76	3970	.. .	2026	674	1346	4046	....	....	323	76	....	....	3647
November	95	2880	....	1491	496	988	2975	....	....	278	158	....	....	2539
December	72	2089	.. .	1084	360	717	2161	....	....	228	70	....	....	1863
	1568	42199	....	21921	7274	14572	43767	....	....	4008	1574	....	....	38185
Philanthropic Societies	394	.....	....	.... .	....	394	394	....	....	394	....	....	....	.....
Customs Returns	....	1374	....	376	452	546	1374	....	....	1374	....	....	....	. ....
Total	1962	43573	....	22297	7726	15512	45535	....	....	5776	1574	....	....	38185

HAMILTON, December 31, 1890.

Immigration Agency, for the twelve months ending December 31st, 1890.

Nationalities Remaining in Canada.										Occupation Remaining in Canada.							Not Reported Elsewhere.		Reported Elsewhere.			
English.	Irish.	Scotch.	German.	Scandinavian.	French or Belgian.	United States.	Canadians.	Chinese or Japanese.	Other countries.	Farmers.	Farm laborers.	General laborers.	Mechanics.	Clerks, traders, etc.	Female domestics.	Not classified.	For Canada.	For United States.	For Canada.	For United States.	Effects.	Cash.
103	37	39	26	..	..	53	..	..	17	2	7	15	4	2	14	321	210	186	65	.....	.....	20058
110	34	41	31	..	..	72	..	..	23	3	13	22	3	3	18	249	206	852	105	.....	.....	30010
123	31	56	55	..	..	110	..	..	26	7	54	73	17	3	21	226	285	2905	116	.....	.....	34995
276	67	87	106	..	..	111	..	..	39	23	97	105	8	5	86	362	467	7112	219	.....	.....	47560
279	91	101	98	..	..	102	..	..	32	27	116	122	10	8	81	339	453	8399	250	.....	.....	52665
244	50	88	63	..	..	130	..	..	37	11	86	119	4	5	74	313	399	3672	213	.....	.....	37740
179	37	85	52	..	..	101	..	..	37	7	42	73	3	7	42	317	324	1737	167	.....	.....	35515
165	36	91	75	..	..	113	..	..	42	5	54	81	4	3	51	324	393	2532	129	.....	.....	44180
168	35	57	42	..	..	117	..	..	29	3	41	96	9	4	48	247	340	2741	108	.....	.....	35985
147	31	50	51	..	..	105	..	..	15	1	23	18	2	2	34	256	323	3647	76	.....	.....	28131
148	19	66	71	..	..	99	..	..	33	3	34	76	3	3	39	378	341	2539	95	.....	.....	3080
103	24	50	43	..	..	63	..	..	15	2	26	58	2	4	29	177	226	1863	72	.....	.....	14000
2045	492	811	713	..	..	1176	..	..	345	94	593	921	69	49	537	3319	3967	38185	1615	.....	.....	411639
238	....	156	....	..	..	....	..	..	....	..	....	..	..	..	....	394	394	.....	....	.....	.....	.....
152	35	62	110	..	..	335	..	..	679	..	....	....	..	..	....	1374	1374	.....	....	.....	100957	.....
2436	527	1029	823	..	..	1511	..	..	1024	94	593	921	69	49	537	5087	5735	38185	1615	.....	100957	411639

JOHN SMITH,
Immigration Agent.

STATEMENT B.—Return of Immigrant arrivals and departures in the district of the Hamilton Agency, including those reported by the Customs Port of Entry and the Philanthropic Societies for the year ending December 31st, 1890.

NATIONALITIES.	Number of arrivals *via* the St. Lawrence and Halifax.	Number of arrivals *via* the United States.	SEXES.			Total Number of Souls.	NATIONALITIES.						GENERAL DESTINATION.		
			Males.	Females.	Children		English.	Irish	Scotch	German.	United States Citizen.	Other Countries.	Ontario.	Manitoba.	Western States.
English	1037	3443	.....	.....	.....	4485	4485	.....	.....	.....	.....	.....	1791	254	2440
Irish	213	2185	.....	.....	.....	2398	.....	2398	.....	.....	.....	.....	374	118	1906
Scotch	300	1469	.....	.....	.....	1769	.....	.....	1769	.....	.....	.....	634	177	958
German	18	16683	.....	.....	.....	16701	.....	.....	.....	16701	.....	.....	398	315	15988
United States Citizen	.....	1176	.....	.....	.....	1176	.....	.....	.....	.....	1176	.....	803	373	.....
Other Countries	.....	17238	.....	.....	.....	17238	.....	.....	.....	.....	.....	17238	8	337	16893
	1568	42199	21921	7274	14572	43767	4485	2398	1769	16701	1176	17238	4008	1574	38185
Philanthropic Societies	394	.....	.....	.....	394	394	238	.....	156	.....	.....	.....	394	.....	.....
Customs Returns	.....	1374	376	452	546	1374	153	35	62	110	335	679	1374	.....	.....
Total, 1890	1962	43573	22297	7726	15512	45535	4876	2433	1987	16811	1511	17917	5776	1574	38185
Total, 1889	2635	50976	29732	9152	14727	53611	6704	4036	2490	20613	1298	18570	6282	1198	46131
Increase	.....	.....	.....	.....	785	.....	.....	.....	.....	.....	213	.....	.....	376	.....
Decrease	673	7403	7435	1426	.....	8076	1828	1603	503	3702	.....	653	506	.....	7946

HAMILTON, December 31, 1890.

JOHN SMITH,
Immigration Agent.

STATEMENT C.—Yearly return of Immigrant arrivals *via* the St. Lawrence at the Hamilton Agency, and the departure for the year ending December 31, 1890.

1890.	Total.	Nationalities.						Destinations.		
		English.	Irish.	Scotch.	German.	United States Citizen.	Other Countries.	Ontario.	Manitoba.	Western States.
January	77	38	24	15				77		
February	66	37	18	11				66		
March	96	57	19	20				96		
April	219	167	28	20	4			219		
May	250	190	32	28				250		
June	213	144	31	38				213		
July	167	103	16	41	7			167		
August	129	88	13	28				129		
September	108	73	8	27				108		
October	76	46	6	24				76		
November	95	61	10	21	3			95		
December	72	33	8	27	4			72		
	1568	1037	213	300	18			1568		
	394	238		156				394		
Children's Home	1962	1275	213	456	18			1962		

HAMILTON, December 31, 1890.

JOHN SMITH, Immigration Agent.

STATEMENT D.—Yearly return of Immigrant arrivals *via* the United States at the Hamilton Agency for the year ending December 31st, 1890.

1890.	Total.	NATIONALITIES.						DESTINATION.		
		English.	Irish.	Scotch.	German.	United States citizens.	Other countries.	Ontario.	Manitoba.	Western States.
January	384	65	13	24	87	53	142	133	65	186
February	1097	73	16	30	443	72	463	140	105	852
March	3210	66	12	36	1430	110	1556	189	116	2905
April	7579	470	330	288	3077	111	3303	260	207	1112
May	8852	496	477	294	3820	102	3663	262	191	8399
June	4071	482	291	172	1341	130	1655	231	168	3672
July	2061	221	146	81	797	101	715	203	121	1737
August	2925	257	146	101	1154	113	1154	216	177	2532
September	3081	367	214	125	1126	117	1132	220	120	2741
October	3970	389	232	130	1536	105	1578	247	76	3647
November	2880	345	173	110	1033	99	1118	183	158	2539
December	2089	217	135	78	837	63	759	156	70	1863
	42199	3448	2185	1469	16683	1176	17238	2440	1574	38185
Customs Returns	1374	153	35	62	110	335	679	1374	....	.....
Total	43573	3601	2220	1531	16793	1511	17917	3814	1574	38185

HAMILTON, December 31, 1890.

JOHN SMITH, Immigration Agent.

STATEMENT E.—Shewing the number of children received in the District of the Hamilton Agency from the Societies engaged in Immigration for the year ending December 31st, 1890.

NAME OF SOCIETY.	Boys.	Girls.	Total.	Remained in the Home Dec. 31st, 1889.	Remained in the Home Dec. 31st, 1890.
Rev. Mr. Stephenson's Home	48	25	73	8	9
Miss Rye's Home	3	144	147	14	11
Miss McPherson's Home	115	41	156	42	24
Earl of Shaftesbury Home	18	.....	18	.....	.....
Total, 1890	184	210	394	64	44
Total, 1889	494	270	494		
Increase	.....	.....	.....		
Decrease	100	60	100		

JOHN SMITH,
Immigration Agent.

HAMILTON, December 31, 1890.

STATEMENT F.—Shewing the amount of capital brought to Canada by Immigrants and settlers in the District of the Hamilton Agency for the year ending December 31, 1890.

1890.	1890.	1889.	Increase.	Decrease.
	$ c.	$ c.	$ c.	$ c.
January	20,058 00	27,095 00	.....	.....
February	30,010 00	26,515 00	.....	.....
March	34,995 00	48,660 00	.....	.....
April	47,560 00	54,130 00	.....	.....
May	52,665 00	45,875 00	.....	.....
June	37,740 00	40,295 00	.....	.....
July	35,515 00	34,310 00	.....	.....
August	44,180 00	26,815 00	.....	.....
September	35,985 00	29,200 00	.....	.....
October	28,131 00	30,960 00	.....	.....
November	30,800 00	27,875 00	.....	.....
December	14,000 00	38,550 00	.....	.....
	411,639 00	430,280 00	.....	18,641 00

JOHN SMITH,
Immigration Agent.

HAMILTON, December 31, 1890.

STATEMENT G.—Shewing the location of Immigrants reported in the District of the Hamilton Agency, including those sent out by the Philanthropic Societies and those reported by the Customs Port of Entry in the Hamilton District, for the year ending December 31, 1890.

County.	Total.	County.	Total.
Algoma	25	Middlesex	207
Bruce	143	Muskoka	27
Brant	120	Monk	45
Durham	7	Nipissing	2
Dufferin	33	Northumberland	5
Essex	120	Norfolk	139
Elgin	114	Ontario	13
Frontenac	8	Oxford	173
Grey	76	Peterboro'	6
Grenville	4	Peel	49
Halton	108	Perth	274
Haldimand	90	Rentrew	9
Huron	109	Stormont	4
Hastings	9	Simcoe	95
Kent	152	Wentworth	1570
Lincoln	322	Wellington	161
Leeds	4	Waterloo	128
Lambton	111	Wellaud	829
Lanark	6	York	459
Manitoba	1574		7350

HAMILTON, December 31, 1890.

JOHN SMITH,
Immigration Agent.

STATEMENT H.—Shewing the number of Immigrants reported at the Port of Hamilton and the value of their effects, for the year ending December 31, 1890.

NATIONALITY.	Male.	Female.	Children.	Total.	Value of Effects.
					$ c.
English	24	36	26	86	7,465 00
Irish	5	5	10	20	906 00
Scotch	10	11	21	42	1,640 00
German	11	17	34	62	3,145 00
United States citizen	17	38	33	88	20,965 00
Other countries	81	89	120	290	13,904 00
	148	196	244	588	48,025 00

JOHN SMITH,
Immigration Agent.

HAMILTON, December 31, 1890.

STATEMENT I.—Shewing the number of Immigrants reported at the Port of Niagara Falls and the value of their effects for the year ending December 31, 1890.

Nationality.	Males.	Females.	Children.	Total.	Value of effects.
					$ cts.
English	10	9	8	27	2356 00
Irish	1	1	1	3	150 00
Scotch	1	1	1	3	337 00
German	2	3	.....	5	155 00
United States citizens	18	18	10	46	3682 00
Other countries	23	23	22	68	6069 00
	55	55	42	152	12749 00

JOHN SMITH,
Immigration Agent.

HAMILTON, December 31, 1890.

STATEMENT J.—Shewing the number of Immigrants reported at the Port of Fort Erie and the value of their effects for the year ending December 31, 1890.

Nationality.	Males.	Females.	Children.	Total.	Value of effects.
					$ cts.
English	4	4	4	12	1070 00
Irish	2	2	2	6	65 00
Scotch	2	2	1	5	600 00
German	9	7	8	24	720 00
United States citizens	49	60	67	176	17107 00
Other countries	43	43	73	159	7729 00
	109	118	155	382	27291 00

JOHN SMITH,
Immigration Agent

HAMILTON, December 31, 1890.

STATEMENT K.—Shewing the number of Immigrants reported at the Port of Niagara and the value of their effects for the year ending December 31, 1890.

Nationality.	Males.	Females.	Children.	Total.	Value of effects.
					$ cts.
English	1	1	3	5	1025 00
Irish	3	3	.....	6	275 00
Scotch	1	1	8	10	100 00
German	1	4	5	10	500 00
United States citizens	.....	.....	.....	.....	.....
Other countries	.....	.....	.....	.....	.....
	6	9	16	31	1900 00

JOHN SMITH,
Immigration Agent.

HAMILTON, December 31, 1890.

STATEMENT L.—Shewing the number of Immigrants reported at the Port of St. Catharines and the value of their effects for the year ending December 31, 1890.

Nationality.	Males.	Females.	Children.	Total.	Value of effects.
					$ cts.
English	6	10	7	23	2025 00
Irish					
Scotch	1	1		2	150 00
German	2	2	5	9	200 00
United States citizens	7	10	8	25	1560 00
Other countries	42	51	69	162	7057 00
	58	74	89	221	10992

JOHN SMITH,
Immigration Agent.

HAMILTON, December 31, 1890.

STATEMENT M.—Shewing the total number of Immigrants and the value of their effects at the respective Ports of Entry in the District of the Hamilton Agency for the year ending December 31, 1890.

Nationality.	Hamilton.	Niagara Falls.	Fort Erie.	Niagara.	St. Catharines.	Total.	Value of effects.
							$ cts.
English	86	27	12	5	23	153	13941 00
Irish	20	3		6		35	1396 00
Scotch	42	3	5	10	2	62	2827 00
German	62	5	24	10	9	110	4720 00
United States citizens	88	46	176		25	335	43314 00
Other countries	290	68	159		162	679	34759 00
	588	152	382	31	221	1374	100957 00

JOHN SMITH,
Immigration Agent.

HAMILTON, December 31, 1890.

STATEMENT N.—List of Retail Prices of the ordinary articles of food and raiment required by the working classes.

ARTICLES.	Prices. From	Prices. To	ARTICLES.	Prices. From	Prices. To
	$ c.	$ c.		$ c.	$ c.
Bacon.....per lb.	8	12	Eggs .....per doz.	12	25
" (ham) ..... "	12	15	Potatoes.....per 60 lbs.	40	50
" (shoulders) ..... "	10	12	Salt ..... "	40	50
Pork ..... "	8	10	Fire wood .....cord.	4 00	5 50
Beef ..... "	7	12	Coal .....2000 lbs.	4 75	5 25
Mutton ..... "	10	12	Coat (over)	5 00	10 00
Veal ..... "	7	12	" (under).....	4 00	6 00
Butter (fresh) ..... "	15	25	Pants	2 00	3 50
" (stale) ..... "	12	18	Vests	1 00	2 00
Candle ..... "	10	12	Shirts (flannel)	75	1 00
Cheese ..... "	8	12	" (cotton)	50	75
Coffee..... "	25	40	" (underwear).....	25	50
Codfish ..... "	8	10	Drawers (woollen woven).....	50	75
Mustard ..... "	12	15	Hats (felt)	75	1 50
Pepper..... "	20	20	Socks (worsted)	15	25
Rice ..... "	4	5	" (cotton)	10	15
Soap (yellow) ..... "	4	4	Blankets ....per pair.	3 00	4 00
Sugar (brown)..... "	5	.....	Rugs.....	1 00	1 50
Tea (green)..... "	25	50	Flannel ..... per yd.	20	35
" (black)..... "	25	50	Cotton ..... "	3	12
Tobacco..... "	40	50	" (double sheeting).. "	15	25
Corn-meal ..... 100 lbs.	2 00	2 25	Canadian tweed cloth	40	85
Flour..... "	2 25	2 50	Shoes (men's).....per pair.	1 25	1 50
Buckwheat flour ..... "	2 25	2 50	" (women's)..... "	1 00	1 35
Oatmeal " ..... "	2 10	2 12	Boots (men's)..... "	1 75	2 00
Bread.....4lb loaf.	10	12	" (women's)..... "	1 50	2 00
Milk .....per quart.	5	6	Rubbers (men's)..... "	65	85
Herrings..... ....per bbl.	5 00	5 50	" (women's)..... "	45	60

HAMILTON, December 31, 1890.

JOHN SMITH,
Immigration Agent.

STATEMENT O.—Rate of Wages paid in the district of the Hamilton Agency for 1890.

EMPLOYMENT.	Wages.		EMPLOYMENT.	Wages.	
	From	To		From	To
	$ c.	$ c.		$ c.	$ c.
Bookbinders and Printers	1 50	2 25	Ship-wrights	1 75	3 00
Blacksmiths	1 50	2 50	Tailors	1 25	2 50
Bakers	1 50	1 75	Tinsmiths	1 25	2 00
Brewers	1 50	3 00	*Woollen Mills.*		
Butchers	1 50	1 75	Card-room	50	1 25
Brick-makers	1 75	2 50	Spinners	1 00	1 50
Brick-layers and Masons	3 00	3 30	Weavers	75	1 25
Boiler-makers	1 50	2 50	Dyers	1 00	1 50
Carpenters	2 00	2 50	Wool assorters	1 25	1 75
Cabinet-makers	1 50	2 50			
Coopers	1 50	2 00	*Cotton Mills.*		
Fitters	1 75	2 50	Card-room	50	1 25
Firemen (locomotive)	1 50	1 75	Spinners	1 25	1 50
Labourers (common)	1 25	1 50	Weavers	80	1 25
" (farm)	1 25	1 25	Over-lookers	2 25	3 00
" (railway)	1 25	1 50	*Females per month with board and lodging.*		
Lathe hands	1 50	2 50			
Moulders	2 00	3 00	Cooks	12 00	20 00
Millwrights	2 00	2 50	Dairy maids	7 00	10 00
Millers	1 25	2 50	Dressmakers and Milliners	10 00	15 00
Painters	1 50	2 25	General servants	8 00	12 00
Pattern-makers	1 75	3 00	Laundry maids	10 00	12 00
Plasterers	1 75	2 50	House maids	10 00	12 00
Plumbers	1 75	2 25			
Rivetters	1 50	1 75	*Monthly hands with board and lodging.*		
Shoemakers	1 50	2 25	Farm labourers	12 00	15 00
Stone-cutters	2 75	3 50	Harvest hands	20 00	25 0
Saddlers	1 25	2 00	Lumbermen	15 00	25 00

HAMILTON, December 31, 1890.

JOHN SMITH,
Immigration Agent.

No. 6.

ANNUAL REPORT OF A. G. SMYTH, ESQ., DOMINION IMMIGRATION AGENT, LONDON, ONTARIO.

Immigration Office,
London, 31st December, 1890.

Sir,—I have the honour to transmit herewith my full annual report for the year ending 31st December, 1890.

The total number of arrivals was 1,189, of which 741 remained in the Province of Ontario; 207 went to Manitoba, the North-west Territory and British Columbia, and 241 to the Western States, and the total value of cash and effects brought in by those settling in Canada of the above was $30,600.00, besides which I enclose the returns through the customs of the port, viz., 311, all of which settled in Ontario and brought in $21,385 in effects alone.

The number of arrivals was less than in 1889, but was generally composed of a very good class, and suitable to the requirements of our country. Farm labourers, domestic servants and general labourers got employed in a very short time after arrival, and at good wages, based upon their skill at the work they were able to do. They were all very healthy and tidy and thrifty in appearance. The demand was much in excess of the supply, and at the present time even, I could find good places for steady and industrious young men and capable domestic servants. Married men with families are not so easily settled. There is a capital opening for female servants with our farmers; they need to be strong and willing, and although the wages are not so high as in cities and towns, they do not require so much experience in household duties.

All of which is respectfully submitted.

I have the honour to be, Sir,
Your obedient servant,

A. G. SMYTH,
Government Immigration Agent.

David Spence, Esq.,
Secretary, Department of Immigration,
Toronto, Ontario.

STATEMENT shewing the number of Immigrant arrivals and departures at this Agency for the twelve months ending December 31st, 1890, and their nationalities, the number of free meals and free passes by railways, or other conveyances, from this Agency to their respective places of destination.

MONTHS.	Number of arrivals *via* the St. Lawrence and Halifax.	Number of arrivals *via* the United States.	Total number of souls.	Went to the United States.	Went to Province of Quebec.	Went to Manitoba, British Columbia and North-west Territory.	Remained in the Province of Ontario.	NATIONALITIES OF IMMIGRANTS SETTLED IN ONTARIO.									Number of free meals.	Number of Immigrants fed.	Number of free lodgings.	Number of free passes.
								English.	Irish.	Scotch.	German.	Scandinavian.	Swiss.	Icelandic.	American.	Other Countries.				
January	53	37	90	19	.....	22	49	27	13	9	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
February	46	33	79	15	.....	15	49	21	15	7	6	.....	.....	.....	.....	.....	.....	.....	.....	.....
March	38	46	84	17	.....	15	52	20	13	6	13	.....	.....	.....	.....	.....	.....	.....	.....	.....
April	74	58	132	38	.....	20	74	33	34	2	5	.....	.....	.....	.....	.....	.....	.....	.....	.....
May	125	54	179	21	.....	22	136	97	10	21	8	.....	.....	.....	.....	.....	.....	.....	.....	.....
June	74	49	123	20	.....	30	73	35	9	21	7	.....	.....	.....	1	.....	.....	.....	.....	.....
July	56	67	123	25	....	20	78	47	15	13	3	.....	.....	....	.....	.....	.....	.....	.....	.....
August	58	38	96	14	.....	22	60	33	14	3	9	1	.....	....	.....	.....	.....	.....	.....	.....
September	42	45	87	22	....	5	60	32	15	13	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
October	43	25	68	15	...	17	36	16	3	17	.....	.....	.....	.....	..	.....	.....	.....	.....	.....
November	43	22	65	19	.....	11	35	21	8	3	.....	3	.....	.....	.....	.....	.....	.....	.....	.....
December	30	33	63	16	.....	8	39	18	10	9	.....	.....	.....	.....	2	.....	.....	.....	.....	.....
Total	682	507	1189	241	.....	207	741	400	159	124	51	4	.....	.....	3	.....	.....	.....	.....	.....

Signed, A. G. SMYTH,
Government Immigration Agent.

ANNUAL REPORTS

OF THE

DAIRYMEN'S AND CREAMERIES' ASSOCIATIONS

OF THE

PROVINCE OF ONTARIO

1890.

I. DAIRYMEN'S ASSOCIATION OF WESTERN ONTARIO.
II. DAIRYMEN'S ASSOCIATION OF EASTERN ONTARIO.
III. CREAMERIES' ASSOCIATION OF ONTARIO.

PRINTED BY ORDER OF THE LEGISLATIVE ASSEMBLY.

TORONTO.
PRINTED BY WARWICK & SONS, 68 AND 70 FRONT STREET WEST.
1891.

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I.—DAIRYMEN'S ASSOCIATION OF EASTERN ONTARIO.

OFFICERS FOR 1891.

President, - - - - - - - - Wm. Eager, Morrisburg.

1st Vice-President, - - - - - - - Platt Hinman, Grafton.

2nd Vice-President, - - - - - - - Wm. Bissell, Algonquin.

Directors :

Division No. 1.—E. Kidd, North Gower.

Division No. 2.—John McTavish, Vancamp.

Division No. 3.—Richard Murphy, Elgin.

Division No. 4.—D. Vandewater, Chatterton.

Division No. 5.—T. B. Carlaw, Warkworth.

Division No. 6.—H. Wade, Toronto.

Secretary, - - - - - - - - Harford Ashley, Belleville.

Treasurer, - - - - - - - - P. R. Daly, Foxboro'.

Auditors, - - - - - - - J. G. Foster, Moira.
M. K. Evertt, Easton's Corners.

LIST OF MEMBERS

FOR 1891.

Name.	Post Office.	Name.	Post Office.
Alexander, A.	Napanee.	Faucet, Arthur	Bishop's Mills.
Alexander, Jas.	Montreal.	Foster, J. G.	Moira.
Ashley, Harford	Belleville.	Forester, Nelson	Lyn.
Ayer, A. A.	Montreal.	Frost, F. T.	Smith's Falls.
Bailey, Arthur	Campbellford.	Gardner, O. L.	Lyn.
Bissell, Jas.	Brockville.	Garrott, W. W	Tweed.
Bissell, Wm. T.	Algonquin.	Gerow, W. F.	Napanee.
Bissell, Howard	Brockville.	Gilroy, Craft	Glen Buel.
Bissell, A. P.	"	Godkin, G. E.	Waterdown.
Brenton, F. W.	Belleville.	Gould, W. J	Elgin.
Brown, W. A.	Carleton Place.	Hinman, P.	Grafton.
Bush, O.	Kemptville.	Hicock, W. W.	Sweet's Corners.
Burnie, Matthew	Spencerville.	Jelly, Robt.	Jellyby.
Campbell, A.	Ormond.	Johnson, H. M.	Cherry Valley.
Carlaw, T. B.	Warkworth.	Johns, A. C.	Fairfield East.
Chipman, Wm.	Ottawa.	Jones, Andrew	Maitland.
Cleal, George	Selby.	Keating, Jas	Lansdowne.
Cummins, Jas.	Lyn.	Keeley, J. D.	Railton.
Cunningham, R. W.	Gananoque.	Kidd, E.	North Gower.
Daly, P. R.	Foxboro'.	Ketcheson, Jas.	Belleville.
Dargavel, Jno. R.	Elgin.	Lane, Jas	Pittsferry.
Davis, A. A.	Brockville.	Lavine, Frank	Elgin.
Daugherty, W.	Napanee.	Legge, Joshua	Gananoque.
Dempsey, W.	Belleville.	Madden, E. J	Newburgh.
Eager, Wm.	Morrisburg	Murphy, R. G.	Elgin.
Eager, Geo.	Kemptville.	Metzler, Robt	Odessa.
Earl, J. S.	Belleville.	Moore, W. A.	Perth.
Earls, R.	Algonquin.	McCready, R.	Lyn.
Eastman, Thos.	Vernon.	McDougall, A. D	Brockville.
Evertt, M. K	Easton's Corners.	McLean, D.	Eric.
Eyre, Geo.	Lyn.	McTaggart, Samuel	Belleville.

LIST OF MEMBERS—*Continued.*

NAME.	POST OFFICE.	NAME.	POST OFFICE.
McTavish, John	Vancamp.	Soper, H. L.	South Mountain.
Publow, G. G	Perth.	Smith, Henry	Harlem.
Purvis, A. P	Maxville.	Stillman, J. H	Campbellford.
Potter, Arthur	Mountain View.	Tallman, Chas.	Kilmarnock.
Ragsdale, W. J.	Bishop's Mills.	Thompson W. H.	Prescott.
Reddick, J. A.	Lancaster.	Thompson, R.	Napanee.
Robinson, G. H	Morin.	Vandewater, D	Chatterton.
Rollins, Robt.	Madoc.	Whalen, Wm.	Centreville.
Spence, Hugh	Norwood.	Warton, W.	Selby.
Spence, S. S.	Cottesloe.	Wilson, Jno.	Maitland.
Strong, P	Brockville.	Wade, Henry	Toronto.
Stagg, Jno.	"	Whitton, Jas.	Belleville.
Stringer, R.	Sand Bay.		

FOURTEENTH ANNUAL CONVENTION

OF THE

EASTERN DAIRYMEN'S ASSOCIATION OF ONTARIO.

The Fourteenth Annual Convention of the Eastern Dairymen's Association of Canada, was held in the Court House, Brockville, on Wednesday and Thursday, January, 8th and 9th, 1891. The President, Mr. JOHN T. WARRINGTON, jr., of Belleville, took the chair at ten o'clock, and called the Convention to order.

ADDRESSES OF WELCOME.

Mr. D. DERBYSHIRE, Mayor of Brockville, in welcoming the Association to the town spoke as follows: As Mayor of this Island City it is my pleasant duty to extend to you a hearty welcome. It should be a source of pride to any community to have the privilege of affirming its hospitality to so distinguished a body as the Dairymen's Association of this province, and although this is only the Fourteenth Annual Convention, yet you are scattering your permanent blessings throughout Eastern Ontario, and exerting an influence far beyond our borders. Well do I remember the early struggles of this Association, when a few patriotic men put their hands into their own pockets to pay the expenses of carrying on our annual and other meetings. Now you are aided by the Ontario Government, who also print your annual reports, and you have the influence of the whole people. Fourteen years ago we had the common butter and cheese that anyone could make, and everybody against us; while to-day, thanks to the good work of the Dairymen's Associations, we make the finest cheese in the world. What means this rapid progress, unless it be the adaptability of this province to the butter and cheese interests and the earnestness and ability on the part of those engaged in its manufacture, aided by this Association and the Government? To-day we stand in the very front. No association of men has done more for every citizen in this province, than the Dairymen's Associations. We can congratulate ourselves that the dairymen of Ontario were the first in the whole world to employ instructors and inspectors. Dairymen in other parts are now following our example, and coming to Ontario to get its instructors. We congratulate ourselves that Canada has the best reputation for making fancy cheese. We have to thank this Association for the plans formulated and carried out, and for the high and enviable position that we now occupy. I trust that you will take hold of the work and make this the finest meeting yet held. It is justly a source of pride to Leeds and Grenville to have among our citizens some of the oldest and most enthusiastic dairymen in the province; those who are alive to all the modern improvements in the manufacture of cheese; those who are aiming to keep this province abreast in this important enterprise. You will have their cordial support and earnest attention. I trust this community will respond liberally to your call for membership, and that you will be instrumental in impressing upon more of our farmers, the need of better stock,

more improved appliances, and a more thorough understanding of the dairy business. I sincerely hope that your pleasure in meeting with us will be as abundant as the welcome we extend to you. I hope that your meeting will be pleasant and profitable and one long to be remembered by your Association.

Mr. D. W. Downey, President of the Board of Trade, briefly addressed the convention in words of welcome. He spoke of the importance of the dairy interests to the province, and also pointed out the influence of the make of Ontario cheese on the British markets. He looked for a still greater improvement in the quality and quantity of cheese made in the province.

Mr. H. F. J. Jackson, a member of the Board of Trade, said he regarded cheese as the staple product of that portion of the province. Twenty years ago the farming interests of the section were languishing in the production of corn, barley and wheat, but the manufacture of cheese had revived the condition of agriculture. He joined in welcoming the gathering.

Mr. John R. Reid, Secretary of the Board of Trade, said he had a friendly feeling towards the cheese industry, having been engaged six years in the produce business, and he had still an interest in the cheese industry. The dairy industry was indeed a tower of strength to the country. Phenomenal progress had been made in the cheese business of the province, and Ontario was now said to be leading the van. At one time the Americans pointed the finger of scorn at Canadian makers and their product, but the tables had been turned. Canadian cheese was now as good as any made in the world. He extended a cordial greeting to the members of the convention.

Ex-Mayor Dana referred to the large amount of money brought into the country by the cheese industry, and welcomed the visitors.

Mr. A. D. McDougall re-echoed the words of welcome spoken by his fellow townsman. Personally he was largely interested in the cheese trade, and had been so for nineteen years. He had started as a manufacturer. He had learned much that was valuable about cheese making at the conventions of the Associations. He could cite factories which had been benefited to the extent of cents—not a cent—on the pound. In fact a man had told him that day that his profits in cheese-making had been doubled by the instruction received at the gatherings of the Association.

The President responded to the addresses of welcome, thanking the speakers for the warm greeting extended to the members of the Association.

THE PRESIDENT'S ADDRESS.

Mr. Warrington then proceeded to deliver the annual address of the President, as follows: It gives me great pleasure to have the honor of occupying the position I do today. I trust that this, the fourteenth annual convention of the Association, will prove even more successful than any of the previous conventions, and that every cheesemaker and every factoryman and all interested in the dairy products of Canada will leave Brockville satisfied that the information they have received well worth the time and money they have expended, and, as Mr. Evertt happily put it last year, "It was good to have been here." In view of the heavy amount of business to be got through, I will make my remarks as short as possible. In the first place I cannot praise too highly the manner in which the inspectors and instructors have done their work. Mr. Bailey's section, Belleville proper and Peterboro district, has not required so much instruction, but the number of people found guilty of skimming, stripping or watering their milk is astounding. Mr. Rollin's section, Kingston and Prince Edward, may not have had nearly the same proportion of adulterated milk cases, but I can speak from personal experience of the marked improvement in the quality of cheese made in those sections under his instruction and I am glad, especially, to see Kingston coming to the front again. I remember the time

when cheese made in Kingston section was considered to be the finest quality turned out in Canada and they commanded the highest price of cheese made in any section. With regard to Messrs. Publow and Ruddick, they have not come under my personal supervision, but from all I can learn they have been as zealous in their duties as Messrs. Bailey and Rollins. One of the most important things to be considered here at this convention, in my opinion, will be the subject of winter dairying. It is my firm conviction that the cow can be utilised as a money-making animal for two or three months longer than she is under the present system, and that, without any detriment to her, and I trust that Prof. Robertson will give us his views on this matter. I have two suggestions to make which I think will improve the sale of cheese. The one is the marked improvement in quality that can be seen in any factory where the cheese is kept 48 hours in the press. A large number of factories about Belleville have pressed their cheese for 48 hours this year, and there has hardly been a cull found among them. In Mr. Carlaw's factory where this 48 hour pressing system was practiced, 258,000 pounds of cheese were made and there was not a single complaint made of a poor cheese. Another thing I would suggest is that the cap cloth be not taken off the cheese when shipped out of the factory. I have had frequent complaints about blackened surfaces on this account. These cap-cloths can be bought ready cut round, at a very reasonable rate from any dealer in factory furnishings. I am just in receipt of an estimate of the stock of Canadian and American cheese on the first day of the year, and I am pleased to inform you that the visible supply is 150,000 less than the same date last year. This promises well for a good demand for your early makes. Trusting this may be so, and with every good wish to you all for a happy and prosperous year, we will now proceed with the business of the convention.

COMMITTEES.

The following committees were then appointed :—

Business—W. Eager, D. Derbyshire and W. Bissell.

Nominations—P. Hinman, D. Vandewater and H. Bissell.

Dairy Utensils—R. Rollins, J. A. Ruddick and G. G. Publow.

Finance—H. Wade, T. B. Carlaw and P. Hinman.

Legislation—H. Wade, D. Derbyshire and Prof. Robertson.

MAKERS, MAKING AND COMPETITION.

Mr. Howard Bissell, of Brockville, was requested to address the meeting in the absence of speakers delayed by the train, and delivered the following extempore address:— I congratulate you, Mr. President, upon being one of the largest exporters of cheese to Great Britain. I feel at home on this subject of the manufacture of cheese, and I believe that both buyers and makers will agree with me when I say that there has been remarkable progress in the industry during the past ten years. And I have not the least doubt that this good result is chiefly caused by the holding of conventions of this and sister associations. I am looking for further progress. But I can plainly see that Ontario must look at the fact that the Lower Province is going to compete very closely with us before long. I had the pleasure lately of attending a dairymen's convention at Cowansville, in the Eastern Townships. It was the first convention of the sort ever held in that section, and it was a success. I spoke there upon the subject of winter dairying, and soon found that they were alive to its importance, and that we must be prepared for their competition. We have also competition across the river. Last September I was in Fulton county, N. Y., and saw September and October cheese sell for 8⅝ to 8 4-5 cents per lb., while the cheese in Brockville was selling for 9⅝ to 9¾. We may well feel proud of

the position we hold at present, but we must not forget that our American neighbors are also putting forth an effort to overhaul us, and some of our best makers are being enticed across the line. They can sell cheese higher at Ogdensburg than they do at Utica because they have Canadian makers, and they will soon be here in this district for more of our best men. In Quebec they are also sending for our makers. Speaking of makers reminds me of the fact that there are some men who imagine that they can learn to make cheese in one year. A maker should study at least two years before he should undertake the charge of a factory, and then he will have a great deal yet to learn. Too many cheesemakers are anxious to make money at the business before they are fully equipped for the work. I believe in employing good makers and giving them good wages, and if a man is a first-class cheesemaker he is deserving of a good price for his work. It is a deplorable fact, however, that some makers cannot make good cheese, and there are too many miserably built and equipped factories in Eastern Ontario. This "cent a pound" business is a great evil. No man can make good cheese if he is paid only a cent a pound. I attended a meeting at North Augusta, where it was announced that a man would tell us how to make cheese at a cent a pound. The man who called the meeting said that if they would guarantee the milk of 200 cows the cheese would be made at a cent a pound. I asked him for his figures, and he said he had not any figures, but that they were making cheese for a cent a pound all over the province. I then asked him how much cheese the 200 cows would produce, and he replied 40,000 lb. I told him that at a cent a pound that would give only $400. I followed up my question by another regarding the wages paid for a maker. I was told that it would be $300. Now, that left $100 only for building the factory, putting in machinery and other expenses. Then I gave him 60,000 lb. for 200 cows, and after estimating the cost of manufacturing, interest on investment, etc., brought him in $297 in debt. (Laughter.) This matter of poor buildings and poor wages needs to be talked about plainly. When I was on the road as instructor I had a good deal to contend with, as the cheesemakers were prejudiced. Some of them would hardly allow me to give instruction. I also found a difficulty in getting a chance to properly inspect the milk. Now the Dominion Government is assisting in the work of analysis, etc., it is easier to deal with the question of adulteration.

Mr. R. G. Murphy, Secretary of the Brockville Dairymen's Board of Trade, was next called upon, and said: I agree with the remarks of Mr. Bissell regarding the manufacture of cheese. I am a partner in quite a large factory, and my experience in regard to the prices paid for making cheese may be worth repeating. We took hold of a large joint stock factory, and in our section of the country they have not proved successful. The principle may be correct, but in practice they have invariably failed. We bought out the stockholders and rigged up the factory in first-class shape. But other factories were all around us. We were, so to speak, the hub, and at the other end of the spokes were factories making cheese at a cent a pound, and we were in competition with all of them. We paid more money for making than the other factories did, and found patrons. We succeeded admirably, and the cheese made pleased the buyers, while at the same time we paid as much to our patrons as those factories did which were not paying their makers so high. It pays to rig up factories in better shape and pay more for making. The patrons will soon help to pay men for any improvements.

A Member—What did you pay a pound?

Mr. Murphy—A cent and an eighth. We declined to run the factory at the prices prevailing around us. At first it was uphill work, but we have succeeded in keeping our patrons and paying them good prices for their milk.

A Member—How do they manage to draw the milk?

Mr. Murphy—Each man draws his own milk, and every one may bring it in his own way.

Mr. Derbyshire—I have been delighted with the very practical addresses given this morning. This afternoon the speakers advertised will be present. We are proud of the Brockville district as being the home of the pioneers in this great cheese industry.

We have now in this section many factories well equipped, and more are continually being built, but Mr. Bissell's factory, five miles from here, is, I believe, the finest in Ontario to-day. Messrs. Murphy and Dargavel have paid a good price for making cheese, and, although so far they may not have cleared much, they have made a reputation as handlers of the finest cheese. Our peop'e are bound that we shall put up good factories and pay a decent figure to first-class makers, for it is only in that way that we can maintain the splendid record we now have. Good cheesemaking cannot be expected at a cent a pound. Our neighbors are waking up all around. Even across the line, in St. Lawrence county, they have hired some of the best makers from here. They are willing to give more money than we will pay if we continue to hire at a cent a pound.

The meeting then adjourned until the afternoon at 2.30.

FIRST DAY.—AFTERNOON SESSION.

The Convention met again at the appointed time, the President in the chair.

THE PRESENT STATE OF DAIRYING IN THE PROVINCE.

Mr. M. K. Evertt, an ex-president of the Association, was called upon for an address, and said: I have been much pleased with the character of the addresses delivered at the morning session. I regard dairying as the leading industry of the Dominion. In order to beat the world, as we have done, or even to keep pace with other countries, we certainly will have to look sharp to our business, and lose no time in producing milk more cheaply and turning out a finer grade of goods. This is a question that is stirring the minds of many thoughtful farmers. If the patrons have not been getting good prices for their cheese about the first place they begin to cut down expenses is in the price paid to the maker. But they are beginning at the wrong end. I repeat that what we have to do is to produce the milk more cheaply. Other countries are beginning to feed cheaper fodder to their stock, and so must we. Some claim that the bottom is falling out of the cheese business. I claim that the dairy industry was never in a better position. The bottom is dropping out of the old plan of feeding and caring for dairy cows, and out of those cows which are not producing the amount of milk a good dairy cow is expected to produce. Factory men are doing all they can to turn out the best goods. Bettter buildings are steadily being erected. We have led the world since 1884, and we shall continue to do so. (Applause.) The mayor said to day that the reason St. Lawrence county, N.Y., was turning out so good an article was because they were getting our makers. Canadian boys have gone to New Zealand and to the Old Country to teach the people how to make first-class cheese. It is the duty of the farmers to come to the rescue of the men who are building up this business, as we cannot afford to take a second place in the manufacture of cheese. I know there has been a very great improvement in the quality of cheese in what is known as the Brockville section this season. We are advancing very fast. I have been able to make and sell $110,000 worth of cheese. Out of that amount I have paid to two factories $46,079.22. Of the $25,000,000 worth of cheese imported by England, Canada sent $10,000,000 worth. With proper treatment and feeding, and using the silo, we should send $20,000,000 instead of $10,000,000. Our return, as regards the value of our milk product, is very meagre, compared with that of Denmark, a country not so large as Ontario. So the question crops up again, how shall we get more milk for less money? Some people say we cannot compete with the west, because there they have food and grasses at all seasons of the year. I hold that the man who has a silo has the far west at his own door, in a compact and convenient form.

THE BENEFITS OF ASSOCIATION WORK.

Mr. D. M. Macpherson, an ex-president of the Association, was also called upon, and remarked: I believe that this dairy interest is to-day superseding every other industry of the country, and in the quality of its cheese and the talent of its manufacture Canada is surprising the nations of the world. In order to keep our proud position we must continue to put science, pluck, intelligence and energy into our work. I was pleased to learn from the last speaker of the high standing Canada has attained in dairy products, particularly in cheese. I can certify to the truth of his assertions. We have not only a good reputation, but we are receiving the advantage of that high reputation, and no individual or nation can gain a reputation for making an article of superior quality without receiving some benefit therefrom. The dairymen of Canada are to-day receiving the reward of their industry. But we must not dream of resting content with our laurels, but go on improving. To cease making progress is to fall behind. Others will go forward with improvements and take our place at the front. We must take advantage of every means to hold our lead, and nothing has contributed and is contributing more to raise the reputation of Canadian dairy produce than the meetings of the Eastern and Western Dairy Associations of Ontario. The interchange of opinions, the results of observation and experiments by our best men are invaluable. The work of these Associations is to-day more popular than ever before, not only with dairymen themselves, but also with the Government. The Government has seen fit to subsidise our efforts very handsomely indeed, and great credit is due to the administration of the province for its liberal assistance in enabling us to carry out the good work planned by these Associations. There are some things, however, in which we can make advances, but I will do no more just now than throw out a few suggestions. I believe that in too large a degree the work of the inspectors has been extended over too wide an area. Yet the good results are so apparent that I believe the Government would be justified in at least doubling its subsidy to the Associations, and increase the grant to $3,000 or $4,000. (Applause.) I have found from experience that the great drawback to-day is the large extent of territory we have to cover. It is too great for a full measure of success. We should have smaller inspectorates, so that the inspectors may have opportunity of visiting the factories oftener and keeping a closer oversight of the manipulation of cheese. We can recognise it as a fact that this system of sending out instructors has been one of the grandest things we have accomplished. It has brought to the manufacturers of cheese the best skill and experience, and has shown them the benefits following the putting of that skill and experience into work. We must further strengthen and systematise this work of inspection and instruction, so as to accomplish even more in the future. It is a certain means of bringing efficiency into our factories and a higher level to the quality and reputation of our product. We must strive to bring each individual factory up to the high standard already attained by the best factories, and in doing that we will raise the reputation of the product of the whole country and increase its value, meet the growing demand for first-class cheese, and lead the world in the future in even more marked a manner than we have done in the past.

WINTER DAIRYING.

Prof. Robertson, Dominion Dairy Commissioner, was next called upon, and after congratulating the Association on its good record and the town upon its enterprise in the matter of handling cheese, proceeded to say: I was very glad to learn from the remarks falling from the lips of Mr. Everett that he was preaching that good gospel of people minding their home end of the business first. I thought as I listened to him that if he took pattern by many dairymen I know of, he would have been running down the cheesemakers, the salesmen, the buyers, the Government, the old country market, the Association, and in fact everything but his own carelessness. It is a good thing for a man to remember that the most important part of his business is his home end of it, and that he cannot improve matters by paying too much heed to the market end of it. In

looking over this large audience I find what I expected to see—representatives of all those engaged in this cheese business, now not only a large industry but the best paying one in our province. I find the farmer, the maker, the local buyer and the large exporter here. To each one of us an advantage must come in considering how we can improve our business for ourselves at the home end and not at any other man's end. I cannot accomplish much in striving to instruct a dairyman how to improve his circumstances if all the time I am directing his attention to the man in Montreal who sends back for a rebate of a half or quarter a cent. per lb. on ten boxes. And when I speak to cheese-makers it will not be about those ends over which they have no control.

From my standpoint, as Dairy Commissioner for the Dominion of Canada, I have some plans under consideration, by the carrying out of which I hope to help very materially the cheese business during the coming summer. Meanwhile I would like to notice that all over this province of Ontario we have very many more cows to the square mile than they have anywhere else in Canada. When population is of the right sort, it is an important factor in the success and prosperity of a district, and it is generally a good indication of the value of property. It has been estimated that each new immigrant is worth $1,000 to the country,—but that is only one kind of population. A large cow population also means wealth and permanent prosperity, for where the number of cows is increased, every township, town and county in that immediate district is bound to get the benefit of their productiveness. Wherever you find an influx of producers giving out more than they take, there is thrift. In every part of Ontario where there is arable land there should be four times as many cows kept as are now owned. We should keep 25 cows on each 100 acre farm. This would mean more money in circulation. I want to say a few things as to how this can be done in Ontario. Owners of cattle must learn what immense value lies in the corn plant. Some people think that when a man begins to talk corn, corn, corn, that he has corn on the brain. But let me tell you that until a man gets cheese on the brain he never wins prizes or gets the first call on the cheese board. (Applause.) I would like to get in every township men who are regarded as cranks on corn, and this would do the township more good than the presence of men who are willing to be exhorters on the political hustings. Corn is one of the hardiest growers of any plant cultivated on the farm. It is easier to grow, and it suffers far less from parasites. People thought for years that the corn crop was adapted for the southern or middle states, but that it could not succeed in Canada. I have never seen a farm in Ontario that had not some land suitable for a fair crop of corn. During the last season on the Experimental Farm at Ottawa the cost of growing a crop of corn, counting the rent of the land, the cost of the manure ($\frac{2}{3}$ value), cost of seed, labor of filling the silo, etc., was $1.34 a ton. We are feeding cows on fifty or sixty pounds of corn ensilage a day and they are thriving upon it. We will be feeding some steers also on corn ensilage alone, and I know that they will do well on sixty pounds a day. Fifty pounds of ensilage costs about $3\frac{1}{2}$ cents, and the manure is just about worth the work of feeding. You will readily perceive that a farmer can winter just four times as many head at $3\frac{1}{2}$ cents a day each as he can if the feed costs 14 cents a head, as it ordinarily does. This is one way in which a man can increase the cattle population —four times the number of cows can be wintered at the same outlay. Sixteen tons per acre of corn is a reasonable yield, and that quantity will winter, so far as fodder is needed, four cows for five months and a half, while an acre of average hay will not carry one cow through the winter. And the farmer will not only feed his cows more cheaply on ensilage, but he can have more on the same acreage. I know of one case on this continent where a firm keeps 258 cows on 204 acres of land and buys little feed except cotton seed meal and bran from the proceeds of the skim-milk. Everyone cannot do that, but most dairymen could keep 25 cows per 100 acres. That is four times more than is the average. I am in this matter advising what every man can do. If I advised a man to hold back his cheese, it might be that the market price would come down and he would blame me for giving him wrong counsel. But there is no such risk in recommending the growing of corn for winter feeding. You may put this first of all, that the man who grows corn for the making of ensilage should try to grow that corn in rows or hills, so as to admit of plenty of sunlight and a free circulation of air.

A MEMBER.—Do you believe in the rows being far apart?

Prof. ROBERTSON.—About 3 or 3½ feet apart. Grow your corn in rows about that width apart so as to get broad leaves, and lots of them. If you grow corn too close together the leaves will be white and delicate and the whole plant will lack vigor. The nutritive qualities of corn as shown by analysis, are in these proportions: Nearly one-half are in the leaves, about one-fourth in the stalks, and the remaining fourth in the nubbins. I had this tested by selecting 160 plants from different parts of a twenty acre field, grown for ensilage, and it was found that about one-half of the food value was in the leaves. I say, then, let your corn get plenty of light and air, for a plant grown in the dark or crowded too closely to others is bound to grow spindly and weak.

Now, as regards the erection of a silo. I believe a man should build his silo inside his barn if he already has room for it. There is no offensive smell from ensilage. I can put it in my pockets or handle it with my hands, and no bad odor from it will attach to my person. There is no putrid matter about it. The ensilage will keep against single boarding, but not as well as if there are two thicknesses of lumber with tarred paper between. It pays also to have the corners filled by having a bevelled board put in. The triangular space behind it should be filled up with sawdust. If air can be excluded no mould will form; and your chief object should be to so fill the silo that no air can get into it. The corners filled with sawdust give the best results. I do not think any extra good results from coating the lumber with tar or crude petroleum. I question the advisability of putting any preservative on the inside. My friend, Mr. Fisher, M.P., who is here, has had considerable experience with wooden silos, and at his place I saw one silo six years old which did not evidence any signs of decay. In the covering of the ensilage, I have not found much that is new. This year we had one silo covered with six inches of cut straw and eighteen inches of long straw, and there was not more than an inch of waste.

A MEMBER—Do you cut the corn with a straw cutter?

Prof. ROBERTSON—Yes. Our past experience has shown us that where corn is put in the silo uncut, there is always a waste at the butts—where the ends come against the wall. The full corn stalk is very hard to handle, difficult to feed, the cattle will not eat it up so clean, and there is therefore more waste. To those who desire to have their cows give a large flow of milk during the summer, I would say that your best practice is to feed the animals well all winter. If a cow is fed dry fodder all winter, she will give less milk when fed on succulent grass, because of that poor feed in the previous winter months. It is a great gain to feed a cow all winter on this succulent corn food from the silo, so that her system will be kept in a more relaxed condition.

One of the things that comes within the control of the farmer himself, is the making of his stables more comfortable. I do not know of any subject which has been more neglected than this very important one of constructing cattle-sheds and stables that will be comfortable and convenient and fully adapted to the requirements of the farm. Some of the places used for these purposes are most unsuitable. This means loss of vital power in the cows and less milk. I would have my cows kept warm whether the air was pure or impure, looking to the matter of production. There has been a craze in some quarters for ventilation, but in our climate, if you ventilate a stable as many do with the thermometer 20° below zero, the cows will not enjoy the ventilation. (Laughter and applause.) It is a good thing to have a barn well ventilated, but if we are to have one of two evils, it is better to have the warm stable that is not too well ventilated. In a warm stable not well ventilated, there will not be an offensive odor if you use gypsum.

A MEMBER—What about dry earth?

Prof. ROBERTSON—The dust is not so active, and gypsum makes the very best manure. I have time only to mention the next point, the benefit of having the stables convenient. Much waste of time and valuable manure results from having the stables badly placed. The four conditions requisite for success in handling dairy cows are succulent food, a comfortable place to live in, plenty of water and salt, and kindly care.

As I said near the beginning of my address, too many farmers are looking to the

cheese and market ends of the business for their profits instead of saving in the cost of production and in the by-products. If men will take care of the manure instead of letting it leach, it will mean practically one cow more on the acre of corn grown. Comfort, convenience and compactness, with every device for saving the manure should be considered.

Some farmers are becoming just a little bit disgusted with our glorious cheese trade. If I were living on a farm trying to make money by sending milk to a factory, I too would soon become convinced that milking cows was not a delightful occupation when my cows gave me back less than 3,000 lb. of milk from which I got less than $24 a year. If cheesemakers would give a little more attention to helping farmers to enlarge their capacity in these little things, they would not complain that the farmers were trying to get the last cent out of them. Farmers are finding it so hard to make ends meet and get cheese-making to pay, that they must try to get what they can from everyone. Cows should give 7,000 lb. of milk for a whole year. If you can show a farmer how to get 7,000 lb. of milk from his cow, which means $32 more per cow, he is not going to begrudge the maker $1.75 more for making the 700 lb. of cheese. The quarter of a cent per lb. extra would pay every factory owner so well that he could afford to paint the factory inside and out. I find that a great many men are trying to console themselves with the idea that they are doing a benevolent thing in keeping cows that give a small quantity of milk. I have heard men talk as though they were the neighborhood's benefactors—so kind, generous and charitable. They said in effect: "Because I send less milk it is therefore all the richer, and my neighbors get the advantage of that richness." This is one of those well gilded fallacies that people are only too willing to swallow in preference to the truth. The quality of a cow's milk as regards the solids, is nearly always controlled by its breeding, and the quantity and flavor of the milk by the feeding of the cow. If you can make a cow give you 30 or 50 lb. of milk per day, the larger quantity of milk has just as good and perhaps a better flavor. It would pay every patron of a cheeese factory to have a pass book or ruled sheet for each cow, where a record could be kept for every day in the week. An examination of that record once a day for a week would show what each cow was doing; the man who did that would be a benefactor to his neighborhood.

The home end of the business for cheesemakers is the next point. The important end of the cheesemaker's business is essentially his factory. Every cheesemaker knows in theory that no man can make fine cheese out of impure milk. Every cheesemaker accepts that as a part of his creed. A great many makers bend their energies mainly to scolding factory patrons for not sending pure milk. But they sometimes neglect to furnish a good example, and a good example goes a great way in influencing a neighborhood. Whenever I go to a cheese factory and find the weighing can to be just as bright as hot water and elbow grease can make it I see the milk cans on the waggons in the same condition. And when I find the cheese factory cans dirty, the patrons' are much the same. I have learned that it takes just half as much work to keep a can wholly clean as it does to keep it half clean. Many farmers do not strain their milk. Out of a number of farmers whose milk was recently examined 47 had sent an article which had never been hindered by passage through a strainer. If a man sends a can of unstrained milk the maker will soon remedy the matter if he will put a note in the can when it is returned, to this effect: "I am very sorry to see that some one forgot to strain your can of milk this morning." This note would not be kept on show as school boys keep their cards of honor—(laughter)—but it would have a good effect in the home end of the business. If this were done five-sixths of the off-flavored cheese would not be found.

A Member.—What is the best article to strain through?

Prof. Robertson.—I would prefer a wire strainer for the farmer, and a cloth one for the cheesemaker at the factory.

A Member.—I prefer Canton flannel.

Prof. Robertson.—I have found that where a cloth is used by the farmers, five-sixths of them do not smell sweet. And I would say further that the cheesemakers

must keep every article in the factory clean. A few years ago when I addressed gatherings of dairymen I used to speak of the fat globules, coagulation, casein, rennet and all that. But now, I deem it better to tell the cheesemakers that the main trouble with the Canadian cheese industry is that the factories are not kept quite clean enough. It is worth more to a cheesemaker to keep his factory clean every day than to be talking and studying about fat globules, etc. I do not believe that the factories are as clean now as they were when I made cheese twelve years ago. If cheesemakers will pay more attention to cleanliness, and finish the job right to the end by having neat looking boxes just the size to fit the cheese, and each with its exact weight stencilled upon it, and if they will persevere to the end and work in their own sphere, they need have no fear of the result.

A Member.—How can we secure the kind of corn that will grow the greatest amount of stalk and leaves, and mature at the most favorable time?

Prof. Robertson.—I consider the Thoroughbred White Flint the best.

A Member.—Have you tried the Red Cob?

Prof. Robertson.—Yes. I fear, however, that the Red Cob does not ripen early enough with us for filling the silo.

A Member.—What variety has the most leaves?

Prof. Robertson.—I believe all the large ensilage corns have broad long leaves in plenty.

Mr. Whitton.—Have you ever tried mixing with native corn?

Prof. Robertson.—Not with the same sowing. Why?

Mr. Whitton.—I tried it this year and found good results from it. The Canadian corn matures earlier and helps the other varieties which are rather green and do not fully mature.

W. J. Bissell.—We filled our silo with Canadian and Southern Sweet ensilage mixed together. We find more ears on our own common corn, but not so much stalks, and by mixing the two varieties together we get the very best results.

Prof. Robertson.—The best varieties of corn for ensilage in Ontario are the largest growing sorts which grow to near maturity. One half the acreage should be planted with the large growing sorts, Thoroughbred White Flint, Mammoth Southern Sweet, Red Cob, Giant Prolific Ensilage, and the other half with an earlier ripening variety.

A Member.—How far would you have the rows apart?

Prof. Robertson.—I would have the rows at least three feet apart, and so as to have the stalks from four to eight inches in the row. I would harrow the corn just when it is coming through when the weeds are coming up. That would kill about one-fifth of the plants but you can spare that. If you can get corn to grow well the first four weeks it is in the ground it will take care of itself after that, in most seasons.

A Member.—How do you harrow—across?

Prof. Robertson.—Everyway. It does not matter.

A Member.—Would you make every silo with perpendicular walls?

Prof. Robertson.—So far we have made them perpendicular, and I would not approve of building them a little wider at the top. I cannot see where there is much loss in the perpendicular wall.

Mr. Thompson.—I read an article a short time ago which said that cotton seed meal fed to dairy stock improved the milk.

Prof. Robertson.—In the case of some cows, extra rich feed like cotton seed meal or pease meal will make richer milk, but as a rule the breed has the greatest influence on the per cent. of solids. The feeding of cotton seed meal is a capital practice, if only to get the excellent manure, but I would not feed more than 1½ lb. per day.

A Member.—Do you approve of any particular kind of grain for feed?

Prof. ROBERTSON.—For economy in Ontario forty lb. of ensilage, five lb. of hay or straw, four lb. of mixed barley and pease and two lb. of bran and one lb. of cotton seed meal is a reasonable daily allowance. The cheapest grain this season is the mixture of barley and pease. I would also advise early sowing of grain. We have had six plots sown in the spring, each one a week later than the other. The first and second sowing of barley gave at the rate of nearly sixteen bushels to the acre more than the third plot sown a week later. So those of you who keep cattle for profit should sow your grain early in the spring, and that means that your plow should be going steadily in the fall.

Mr. P. HINMAN.—We sowed our Red Cob corn perhaps a week earlier than usual in order to avoid frost. It ripened so thoroughly that for a week or two before we put it in the silo there was plenty to roast or send for canning. That sown later was not very good. It escaped the frost in the fall, but there appeered to be two or three weeks difference in the time of ripening although only about a weeks difference in the planting.

Prof. ROBERTSON.—We tried planting corn on successive dates, with a week apart and we found that the earliest sown gave us the best quality, but not the most in quantity on account of the frost. It is a good thing, however, to get a big root to the plant. I would prefer to sow half a bushel to the acre and harrow ; but if I did not harrow I would not use so much seed. The proper time for cutting is when the corn is glazing, or when the leaves are turning yellow. If every second stalk carries ears you have a good crop.

A MEMBER.—What size do you cut the corn ?

Prof. ROBERTSON.—I prefer an inch, but I have found that two inches will also do. The cattle will eat it.

Mr. H. BISSELL.—What about feeding the ensilage when there is a good deal of acid in it ? Is there any such thing as sweet ensilage ?

Prof. ROBERTSON.—When the corn is cut it should be left in the field two or three days, and then it will keep for two or three years. I have never seen ensilage entirely free from acid. It does not do for corn to be put in too green, or it will develop lactic acid or the acid of sour milk, which is very offensive.

Mr. ASHLEY.—Would you put water on it if too dry ? I did so this year.

Prof. ROBERTSON.—If the corn was too dry I would put water on it.

Mr. H. BISSELL.—The reason I asked if there was any such thing as sweet ensilage was because some people will smell the corn and say it is sour when there is nothing more than a brewery smell to it

Mr. KEELEY.—I filled my silo last year and followed the advice then given about feeding. I began feeding the cows in January, giving them a little ensilage only. At that time the animals were in good shape. They calved in February, but kept going down, although I also gave them all the hay, straw and roots they would eat. They got poorer and poorer, and I never had a thin cow before. But this year I had the same silo and the same ensilage, and I fed them all the corn they could eat. I went up to the silo one day and it fell in five or six inches. I felt like swearing—(laughter)—and had hard work to keep from falling a second time. But from that silo I have given my cows all they could eat—they will hardly eat anything else but ensilage now—and to-day I have the plumpest and thriftiest looking cows in the section, and have also sold my milk and butter for more than anyone else in the neighborhood. I have fed ensilage straight, and nothing but ensilage. My corn got the frost before I could cut it this year. We commenced to fill on the 16th of September and it got the frost, and I was afraid it was not going to be a good year. But to-day I am proud of the appearance of my cattle.

Mr. ASHLEY.—I had a case last year somewhat similar to Mr. Keeley's. I found that my cows would not eat the ensilage, which was a part of their allowance. I left the ensilage in the silo, and the cows are now eating it freely. That silo settled half way down, and was being continually filled up. It settled nearly to the ground in the corners, and this year while tramping it my man went down through a hole and I could

not account for that. The silo was sheeted inside and covered over with tarred paper and matched lumber and covered over with hot tar. I cannot account for its settling down so, and why the cows will eat this year when they would not do so last year.

Mr. CARLAW.—I was one of the first in the Peterborough district to try the silo. If the corn is well tramped in the silo it will remain sound. Mr. Ashley must have had a lazy man. (Laughter.) I get all the ears and all the stalks I can. I mix Crompton's Early and the Mammoth Southern Sweet or Red Cob. I have not raised more than fourteen tons to the acre of the varieties I have named, but I have had twenty tons per acre of other kinds, for instance, the Michigan Dent corn, which will grow eight feet high with many large leaves. We have been told at our conventions about cutting the corn one, two and three inches in length, but you cannot get the cutter to cut it three inches long with any degree of satisfaction, for the machine will be running idle half the time If you cut it five-eighths or three-fourths of an inch it will be more practical and profitable, as you can get a little more in. I believe that Prof. Robertson is the best posted man on this subject of dairying that can be found on the continent of America to-day. (Applause.) I used to be like other farmers, thinking that if I got 3,000 lbs. of milk from the cow that was all she could do for me, but since I have begun to feed the creature properly she has nearly doubled that quantity. But it will take starvation to drive the average man to do what he should in this matter. (Laughter.) We must look to an increased production of milk for our profits, for I do not think we will ever get twelve cents per pound for cheese again.

A MEMBER.—What breed of cow do you prefer?

Mr. CARLAW.—Would you have me pick a wife for you? (Laughter and applause.) Get the cow of your own choice if she will fill the bill—or the pail. It does not matter where she came from. I do not care whether she is called a common Canadian cow, a Jersey, an Ayrshire or a Holstein. You can get the common cow to do just about as well as any if you feed her properly. Do not get a grade of a thing there is nothing in. Nothing from nothing and nothing remains.

Mr. REDMOND.—Prof. Robertson has talked about the farmers and the cheesemakers, but he has not given us his opinion of the cheese-buyers. I hope he will speak to us about the buyers and the exporters. We have had some differences in the past with the cheese-trader, and it is to be hoped that the Professor will give his opinion on this subject.

The PRESIDENT.—Prof. Robertson will speak later on, and will doubtless touch upon the point suggested.

Mr. EVERTT.—I think the corn Mr. Carlaw spoke of is the same that I alluded to to-day. He calls it the Michigan Dent while I have known it as the Minnesota Dent. I would advise Canadian farmers to try that variety. It will mature well in the Brockville section, if sown early. It is very prolific of leaves and has a fine stalk.

Mr. CUMMING.—I suggest that Prof. Robertson speak a little further this afternoon. I imported a car load of Michigan Dent and sold it freely, and it has given great satisfaction. It had ears 14 inches long in some instances.

Mr. CARLAW.—That corn is grown in Minnesota and Nebraska, and if it stands the climate there it surely ought to do so here also.

Prof. ROBERTSON.—I have no reason to be afraid of saying to the cheese-buyers or salesmen here anything that I believe should be said about their end of the business. This business of cheese-buying and exporting involves the handling of a large amount of money, yet it stands peerless among the trades and callings of the country as to honesty I do not find as much litigation in this calling as in others of like proportions. A law suit is a rarity, and that in a business of over $10,000,000 a year speaks well for the men engaged in it. (Applause.) I put this down first, that the buyer is not altogether a benevolent gentleman, but a man who wants to make a living and a *little* profit. When a cheese-buyer comes to a salesman it need not be expected that he is going to make a present of a half cent a pound to the other. If a man buys cheese for 10 cents he should

not expect to get 9½ cents worth of cheese with a few pounds per box thrown in. If he buys cheese for 10 cents he has no right to get the salesman to dock off weight so as to bring the price down to a fraction less. During the last year there has been a little too much of this, which is not altogether above board—in that one factory gets more than another factory and gives a pound or two a box of cheese extra that is never paid for. Something for something and never expecting anything for nothing is fair. The chairman in speaking this afternoon said he hoped I would say something on winter dairying. I believe that farmers all over the country should add to their cheese business by making fine butter. When I first advocated that a great many farmers said my remarks showed that I was hostile to the cheese trade. They argued that every gallon of milk that went to butter-making took so much away from the cheese factory. But this conception is no longer accepted. No business can expect to be maintained comfortably upon a loss in any branch of it. Why persist in having cows milked for just six months (the average cheese factory is going but five and a half months) when by having the cows milked for ten and a half months you can send as much milk to the cheese factory and have more profit all the year around, with an income for nearly every month? The man who will attempt this will have more cows, better fed, giving more milk for a longer period, and there will be an increase in the cow population of the country. It will mean a longer winter season of production and manufacture, which means more earning power. Better calves will also be raised, and the reproach will be taken away of "cheese-factory calves —mainly barrel, hair and legs." The winter calf will be stronger, and having more care will be fortified in youth. The stock will be increased by better cows grown from calves worth rearing. We have now a large trade in the exportation of cheese to other countries, and as the quality improves the consumption will increase. But those countries which buy cheese from us buy twice the value in butter from all countries that they do in cheese. We have here the best opportunities for making cheese in the summer time, but we cannot make the article to advantage in the winter time First of all we have cold weather. The milk is extra sweet and it is hard to get body in the goods. But we have the best climate for making fancy butter in the winter. We have cold weather for keeping cream sweet and for keeping butter unhurt by transportation. We ought, therefore, to follow out our natural adaptations, and manufacture butter in the winter season. Then we will find more profit in this dairy business; we will extend into more stock and raise steer calves. It has been said that a man cannot raise milking stock and also raise steers. But that is a mistake. No one man cares to milk more than twelve cows, but he can feed and milk easily ten cows and feed ten steers, and find profit in it. Winter butter-making will soon mean a footing in the English markets, and fresh-made butter there is worth 26 cents per lb. Danish butter was quoted in Liverpool last week for 133s. and American summer creamery at 45s. There was no fancy Canadian butter selling. A few years ago I sold Canadian butter with the bloom on it to take the place of Danish butter, and there was no limit as to price. We can get the same price for butter as the Danes do if we make it as good as they do, and there is twice as many dollars worth of butter imported into England as there is of cheese. It would give us more money, more profit, and more transportation business during winter. A doubt has been expressed as to whether we can establish this trade in England. It is hard to overcome prejudice and get rid of a bad name. Nearly one-fourth of our fancy cheese is still sold as English cheddar. It goes from here as Canadian cheese, but it is palmed off as English cheddar by the retailer over there. If this is the case after twenty-five years' experience with cheese what will it be with butter? It was asked at one of our conventions that the Government should undertake to make an appropriation of $5,000 for the purpose of introducing fresh-made butter into the British markets by small, regular shipments until the name of Canadian butter was established and the people would call for it. Nothing was done in the matter; but it is now under consideration how far the office of Dairy Commissioner can be be used in having experiments made in butter making as well as cheese making, and having that butter sent to England every week until we lead the farmers to see the benefits of producing good butter, and thus induce buyers to forward shipments of our finest fresh-made butter to the Old Country. We hope to be able to demonstrate that farmers can get a large profit in sending cream

to the creameries during the winter, and also demonstrate that we can send to England as fine butter as she can get from any other country, while at the same time we hope to educate the English people to call for Canadian butter, furnished by men who have plenty of time in winter, and a good opportunity to handle the product to advantage. I trust this is something that will commend itself to all present. I am glad that we have here the Minister of Agriculture for the province—a gentleman who has at heart the interest of the farmers. We have also Mr. Thomas Ballantyne, who is the father of the cheese industry in this province, and we have the genial Gov. Hoard. Here is a triumvirate such as has never been presented to an audience of agriculturists before. (Applause.)

ENSILAGE FOR WINTER MILK.

Mr. Sydney Fisher, M. P. for Brome being called upon for an address, said : I had no idea in coming to Brockville on this occasion that I should be called upon to address you, and for two reasons. In the first place I understand that this is a meeting of cheesemakers, and as I am essentially a butter maker and really know nothing about the manufacture of cheese I do not believe I would be justified in asking your attention for any length of time. I may say, in the second place, that I came here to try and find out why the Brockville Cheese Board and the makers of this district have been able to distance us so much in the prices commanded by your cheese. We of the neighboring province have been looking for a long time with envy upon the success of the Ontario cheese makers. In years gone by our Eastern Townships butter led the other provinces and commanded the markets, but of late we find that Ontario butter has been pressing us, and we must bestir ourselves if we would keep ahead. Of late years, however, we have been turning our attention to cheese making, and are putting forth considerable effort to promote the industry. You need not fear our rivalry, however, for even if the other provinces make better cheese it will only put you upon your mettle to make a still better article. I have been very much interested in the remarks made upon the subject of ensilage. I have also been much interested in what has been said on winter dairying, for that has been my hobby for the last three or four years. I have had greater success than ever before by following out the plan outlined by Prof. Robertson. I have found that even during the summer I can produce fully as much milk from my cows, notwithstanding the fact that they are giving the extra milk in the winter. Or in other words, I do not believe the production of milk in winter is going to affect the yield of milk in the summer. This means that cows can be milked for ten months in the year as well as for six months. I got tired of having my cows doing nothing, and am now making a profit out of my winter milk while it does not interfere whatever with my summer supply. And this has been done by ensilage. I was convinced some years ago that this was the right system, but was frightened at the cost of the silo as then built. I have taken some credit to myself that I was the first man on the continent of America to make a wooden silo. (Applause.) There need be no fear at all of building a silo. It will enable you to feed your cows at a nominal cost, and you can raise your corn at very little more trouble than it gives you to raise grain. Prof, Robertson has given you a sketch of a silo. I have built several silos, and I can assure you that any farmer can build one only costing at the rate of 50 cents per ton capacity, that is to say a 100-ton silo can be built for $50. I am convinced that a 100-ton silo can be built in any neighborhood at an outside cost of $60 or $70 for the full cost of its construction. I do not think, therefore, that there is anything to frighten farmers from entering upon this new system. We can feed more cows on the same extent of land, and therefore enter the industrial and commercial race with brighter prospects. We can make more butter at a time of year when the price is the highest for that article. I am very glad to be here to learn what I can from your methods, and find out what is the secret of the wonderful success which has attended the efforts of the cheese men of this Brockville district.

The convention then adjourned until 8 p. m.

FIRST DAY—EVENING SESSION.

A large audience, including many ladies, assembled at the Opera House at the evening session. President Warrington occupied the chair. The platform was occupied by prominent members of the Association and leading citizens of Brockville.

A WELCOME TO HON. MR. DRYDEN.

Mr. D. Derbyshire, Mayor of Brockville, read the following address on behalf of the citizens of Brockville:

Address from the Citizens.

Hon. John Dryden, Minister of Agriculture,
Toronto, Ont.

My Dear Sir,—We are delighted to have you with us this evening, and extend to you a hearty welcome to our Island City and Eastern Ontario. We feel it a great honour to have you here to aid us in advancing one of the greatest industries of our country. You are now in Brockville, the county seat of the rich old agricultural counties of Leeds and Grenville, among the pioneers of the great dairy industry of this province, where the largest and by far the most important dairymen's board of trade in the Dominion is held, where some of the finest factories in the land are situated and a great many of the most energetic agriculturists of advanced thought live. I know, sir, that some of our Ontario Ministers think that if they visit the peninsular or western section they have seen the best of Ontario, but we are gratified that you have come to our eastern section, and I would say to you now, if you desire to be strong in the interests of agriculture, as I am sure you are, "Look well to the East." We feel proud of you that you belong to a Government that has ever had a fostering care over every interest pertaining to agriculture. I shall always remember Hon. A. M. Ross, then Commissioner of Agriculture, who so generously assisted this and kindred associations, farmers' institutes, our agricultural college and attended carefully to the wants of our agricultural community. But, we sir, expect greater things from you because this has been your life work. You have been specially trained for the very important position you have been called to fill; you have always led in every branch of agriculture in your section; you know our wants and failures in the past, and thus you will be able judiciously to apply the remedy. You represent the seven-tenths of our people upon whom the whole are dependent. And, sir, we congratulate you on your clean record in parliament and every other public position you have been called upon to fill, on your legislative ability and also on your careful, consistent life. We feel proud of you as our special representative and trust you may long be spared to adorn the position which your high attainments so admirably qualify you to fill. Again, sir, I bid you welcome and extend to you the freedom of this our Island City.

D. Derbyshire,
Mayor.

President Warrington then presented the honourable gentleman with the following:

Address from the Association.

Hon. John Dryden,—On behalf of the Dairymen's Association of Eastern Ontario, I have pleasure in welcoming you here to-night and of thanking you for your sacrifice of time and the annoyance and trouble of a railway journey to honour us with your presence this evening.

On behalf of the Association I also compliment you on being called upon to fill that most important position, viz.: Minister of Agriculture for the Province of Ontario. You prove, sir, by the inconvenience you have put yourself to to be present with us this evening that you have the interests of the dairy industry at heart and I trust that this visit to Brockville will show you the great work that is being done by this Association to maintain and increase that high character we hold to-day, as manufactures of the finest cheese, on the average, made anywhere in the world, and I trust that the endeavors of the Association will meet with your approval and approbation, and once more on behalf of the Association I bid you a hundred thousand welcomes.

J. T. Warrington,
President.

THE MINISTER OF AGRICULTURE'S REPLY.

Hon. Mr. DRYDEN, in coming forward, was received with hearty applause. He said :

Mr. MAYOR, Mr. PRESIDENT, LADIES AND GENTLEMEN,—While I listened to the mayor reading his address I began to think that possibly I was mistaken after all, and that it was intended for some other gentleman. I must confess that I did not quite recognise the description which in his address he was giving of myself. However, when I got a look at his kindly eye (he can look pretty sharp, too, when he likes), and found that it was really intended for me, I must say from the bottom of my heart I feel like thanking those whom he represented in his address. I am glad to be permitted to visit the town of Brockville. I am glad to be present and meet with the members of this Convention. I meet with a Dairymen's Convention for the first time in my life, and that means, as you all understand, that I am not a dairyman myself. If my other half, I should say my better half, were here, I could introduce to you the "dairyman" of our family, and she is a good one. When I go home the butter tastes all the sweeter and all the better because I think that possibly she had a hand in it. But while not present at your meetings, and while I have not been considered a dairyman myself, I have always taken a deep interest in what you have been doing as an Association. I have watched the efforts which have been put forth by our dairymen in this country. I have also observed how you have increased the dairy products in this country to the immense proportions which it has to-day. I have also observed how the quality of the product has been so much improved, until now my friend, the President, has been telling us that you manufacture the best cheese in the world. Now, I believe that I am not saying too much when I say that every loyal Canadian in this country is proud of the result of the efforts which have been put forth by this Association, and Mr. Fisher will pardon me for saying that this afternoon, while I listened to his address in the other building, that a feeling of pride spread over me as I heard him say that he had come up to this province to learn how it was that our cheese was so much better than that made in the lower province. He says he came up here to learn. I hope that you will endeavor to help him, because you will be only caring for your own interests in doing so. I hold that if they are not putting as good products on the market as you are, they are injuring your trade ; they are injuring you because their product does not come up to the product which you yourselves export. A man thinks he has does a smart thing, possibly, when he has palmed off a thousand boxes of cheese which is inferior and gets nearly as good a price as you do for a superior quality. I say he has done a mean thing. He has injured himself in putting that inferior quality of product on the market. He has injured his country as well. He has injured the reputation of his country. If you ship cheese after such a man has preceded you, your would-be customer looks at your article and says : "There is a Canadian brand upon it ; that came from Canada. I had some from Canada once and I don't want any more of it. It is an inferior quality, and I desire you to understand that lightning does not strike more than once in the same place." (Laughter and applause.) I wish that I could influence our farmers all over the country that in the product of their farms they would seek to produce a better quality of whatever article they are sending forward to market. It is just as true of every article as it is of cheese. The fact is, what we want to do as farmers is to increase the quality of every article which we produce. Of what advantage is it to me if I am able to produce six or seven hundred bushels of wheat of a very superior quality and put it on the market. I may get a little more than my neighbors. It is put into an elevator and mixed up with other inferior wheat, and the result is that my wheat is to be sold on the average quality of the general product, and therefore it comes to pass that I loose what I ought to gain in that better product. A gentleman told me when he was buying some sheep from me once, "I could give you a good deal more if I were buying a thousand of the same quality, but have to sell your sheep according to the average of the lot." Now, if you can put good beef upon the market you are creating a demand for your product which you would not be able to do otherwise. One of the farm delegates while he was up in the North-west

was relating to me a good deal of his experience. He was like other Englishmen, very fond of beef, and there being steak on the bill of fare, he thought he would try a bit of this beefsteak which was not broiled but fried—and it was fried pretty hard. He got it upon his plate and he used to the very best advantage possible the knife and fork which they had given him, but he could not make any impression on it. He turned it over and tried on the other side, but without any effect. So he called the waiter and asked him "Do your people of this country grade the beef just as they grade the wheat?" "I don't know what you mean," said the waiter. "Well, I mean what I say; do you grade the beef as you do the wheat? If you do I would grade this beef as No. 1 hard. (Laughter.) Now a good deal of No. 1 hard has been put upon the market, and so it goes in reference to all the other articles. I am very fond of a little roast lamb; I like it perhaps better than anything else, and sometimes I screw up my courage sufficient when I am at the dinner table in a hotel, to ask for a piece of this roast lamb. But it turns out to be what I call a ten year old lamb. It is like the chickens. All hens are called chickens, but old hens are generally called spring chickens, the older they get the younger they become. I don't like this sort of thing. I don't know whether it is the butcher or whether it is the landlord that has defrauded me. The fact of it is, I quit calling for mutton. It means that just so much less is consumed. That touches me and you as the producers. Sell to one of your prominent townsmen some of your inferior butter, and I ask you how long will it last. It will last a long time, but if you replace it now with a choice sweet article, then what is the result? Every one wants to eat it, and the result is that the head of the house has to warn the members of his home not to take so much of this butter. Now, it is hard on the consumer, but it is good for the producer. So I say, that if you want to you can create a demand for your own article by putting upon the market a really good quality of that article.

When I was coming here to-day I happened to bring with me one of the reports relating to agriculture in Great Britain, and I observed from this report, that the consumption per head, in Great Britain, of cheese and butter imported is on the increase. Twenty-five years ago the amount per head, which was consumed of butter products, was about four pounds, now it has increased, until in 1889 it was more than double, being 9.04 per head. The cheese consumption has also increased from 2 09 to 5 06 pounds per head, but the truth of it is that within the last five years there has been no increase in the cheese, while there has been a considerable increase in the butter. The inference, I say, is this, that outside Great Britain there are some countries producing butter good enough to create a demand in Great Britain for that butter, whereas the cheese is not being improved in the same proportion. Now, where does this butter come from? I don't think very much of it comes from Canada. I think if you will study it out that you will find that much of it comes from the state of Denmark. Until now I am told that in England parties are inquiring for and demand the Danish butter, no matter what the price is. It is perfectly true that in England and in London, there are those who demand a better quality and they must have it, and I think what we ought to do is to seek, by some possible means, to produce this better quality and so fill this demand. Now how shall this be done? I say it must be done by continuing the process of instruction and education which have been given by this Association in the years of the past, I hope you will not cease. It will take the coming years to educate all the farmers. We cannot see the result of it just yet, but we will see more and more of it as the years go on. Now, I am not one of those who think that governments can use legislation so as to make the people rich. That is not true. But governments can do a great deal in helping the people, and one of the means which they can use is to endeavor to educate them. I am happy to say, however, that the Government of which I have the honor to be a member, will always assist you in this direction. I have, myself, been considering what means we may be able to use in order to do this better than we have ever done in the past. (Applause). We must not stop, we must go forward. We have to enter into competition with all other countries. We must educate the people. I am seeking to do this from my Department, and in order to do this, I have coupled myself with the farmers' institutes of this country, and if there are any of you here who are not interested in

institute work, I beg that you will interest yourself now. I am asking the secretaries of these institutes to send in their names and addresses of all their members, and then I propose that the members of these institutes will have the benefits of all the bulletins and other papers I can lay my hands on. It means some work, but I have just this to say, Mr. President, I believe the Government owes the farmer something in this regard. The Mayor, I think, in his address referred to the fact that I represented in my Department seven-tenths of the people. And I submit that this seven-tenths of the people are at the very foundation of the prosperity of this country. Some of the farmers are beginning to get discouraged. They say it is terribly hard times, everything is looking very blue, and wish they could get into some other business. They cannot carry on any other business successfully in this country if you and I don't prosper, and therefore I say that the Goverment of this country owes something to that seven-tenths of the population which I represent.

You have been good enough, Mr. Mayor, to refer in your address to the fact that some of the Cabinet Ministers think that when they have visited the west they have seen the best of this country. I desire to say in reply that with your humble servant, sir, there is no east or west to this country. I mean to say that my sympathies go out to all the farmers and to all the dairymen, I don't care whether they live in the east or in the west and I am prepared to say that I am bound to treat you all just exactly in the same way. It is just the same when we get down to Quebec. I like the idea of understanding that I am a Canadian. I was born in this country, and I expect to die here. I was born a farmer's son, and I am therefore always proud to represent them and to lay claim to the position of a farmer no matter where I am. Now I say I believe in agriculture for this country. We have not a poor country as some of you seem to think. If you will go to Great Britain you will find that there they have depression. I have seen men there who have lost thousands of pounds in this pursuit, but right alongside of them I have seen men gaining instead of losing. How does that come to pass? They have been willing to adopt some new plan which they have seen will be greatly to their advantage. When a man has got to that pitch that he thinks he knows everything about it I think he has begun to go down. The farmers who hang around the bar-rooms belong to the class of people who have learned all there is to know about their business. They say, "What is the use of me going to their meetings, I am living on the farm my father used to work and I am following in his tracks." Now when you get a man like that you have got a man who sooner or later must go down. He cannot keep up with those anxious to learn. Now, Mr. President, you will observe that my voice is getting husky, and I will only say that I am extremely obliged to you for your kind words. I have made many acquaintances in your town; I have met men whom I wanted to see and I hope to be better acquainted. If you have any suggestions to make I hope you will not be slow to give them. I look to you as helpers in this work. I know that so far as this Association is concerned I shall have your hearty co operation. Give me this and your sympathy and I will always try and keep this country to the front, as it has been in the past. (Applause.)

MIND AND MUSCLE ON THE FARM.

Prof. Robertson began his address by some complimentary references to Brockville and its enterprising cheese buyers, and expressed his regret at the absence of Prof. Saunders, of the Central Experimental Farm, who was to have addressed the meeting, but who was detained by the death of a friend, after which he proceeded to make the following remarks: The farmers of Canada need to do more thinking instead of more laboring with their hands. The experimental stations of this country are intended to aid in the enlargment of thought, and to stimulate activity in head work among farmers. Somebody's clear thinking must precede and underlie every rational action that makes for the mitigation of toil and the increase of profit. Farmers spend too little time in practical thought. Men in other callings sit down to think out the questions pertaining to

their business, but the farmer is often too tired to think on purpose to plan. Every farmer should think out the problems he has to face, and having solved them mentally he should proceed to carry his plans into practice. Too many farmers are content to get their living in a dreary, humdrum way, without a single aspiration more than to have a bare living and two ounces of tobacco a week. (Laughter.) If each would try to be the leading farmer of his locality, profits would come more certainly and easier than if there be only the desire to be merely a sort of higher animal that eats and sleeps comfortably. I was pleased to hear the Minister of Agriculture say that governments cannot legislate good times for the farmers; and governments cannot legislate bad times for the agriculturists. If a man depends upon himself he can make good times come, but if he looks off to the far hills and lets his muscles and brains become numb, he will never amount to anything. Personal ambition is a good thing in a farmer, and so is persistence. Now, farmers often cannot make ends meet, because they lack the element we call persistence. Let me give an illustration. In one part of the Dominion recently visited, I found that the roofs of houses still wore brackets used twenty years ago when the shingles were put on. There were barns grown old where the doors had not been hung. Most things were left half finished, and the people wondered why the good Lord did not smile upon them. They were complaining of hard times and moving away, yet that section is in my opinion blessed with good land and a fine climate. But the people lacked persistence, reliance, aspiration and clear thinking. A farmer's occupation demands peculiar powers and special training. Men who live in cities or towns have only one trade or business or profession, but the man who lives on the farm has to follow a three-fold occupation. He must be a good tradesman and understand the use of tools; he must be a good business man to know when to buy and sell, and he must be a professional man to plan how and when and what to sow in order to get a profit from his work. He must be fitted for his calling if success is to follow. Farming with everybody but Scotch people is to make money; the sole object with Scotch people is to set a good example. (Laughter.) I will not speak to you about the advantage of knowing how to handle tools, etc., any more than to suggest its importance. You all know that in a neighborhood where plowing matches are held annually the crops grow the better. And the boy who excels in plowing usually becomes fond of other farm work. Where land is plowed uniformly the crop has a better chance in the seed bed, and so it pays to encourage good plowing. It is not necessary to dwell upon the business aspect of a farmer's life. It is too generally the case that the farmer does all the business of the family, even after his boys are grown up. The young men have no experience in marketing until they are thrust out at say twenty-five years of age to do for themselves with the experience of a lad of ten. Let the boy take a load of grain to market, and even if he loses a little at first it will not be a great amount, and he will be gaining a valuable experience which will be a most useful part of his education. The farmer should thoroughly understand his business. The man who knows why he drives a spade into the ground will do better work because of that knowledge. If he does not know why he should drain his land he will have failure. Speak to some farmers about their place in society, and they will hardly ever assert themselves as having influence or dominion. But if a man can govern plant and animal life for good he will likely be able also to influence his fellows in the higher activities of life. Many a man is lost because he would not think for himself, but delegated that to others. When a man begins to think, and says "I want to know," he is asserting his manhood, and that one thing distinguishes the man from the hind. A man in those counties where agriculture is behind is called a hind, a grade between a man and a lower animal. But as the tiller of the soil thinks, he assumes, or rather resumes, the birthright of prosperous manhood. In this country we have a capital illustration of this. First we had the deep and almost impenetrable forest, and the farmer was a devastator. Those magnificient monarchs of the woods fell before the strokes of his axe and the bush became a ruin. While the work was destructive there was not much thought or skill required. But when man began to put new plants in the place of those cut down, he began to need the helpful guidance of clear thinking. Then came the construction of roads, the erection of bridges and the building of houses and general development. For that kind of constructive work, that work which emulates creation, a man must have some thought and bring his own hands to his own work. The farmers were at first

getting big crops off virgin fields, but after a time the fields became poor and the crops would not yield enough, and men needed new instruction in order to make the earth give forth a fresh increase. Farmers need to rescue their calling from a condition of decay. No sudden calamity or disease is going to strike us; but agriculture has been suffering from slow decay. Farmers must recover themselves, and that improvement must come through the mind. Many farmers have had a prejudice against education, but I am happy to know that it is no longer needed to plead with them as to the value of an education, for they now say that their boys must not start where they began. The old misconception was that education would hinder a man, but now these old prejudices are being uprooted and it is seen that education helps to fit a man to bring things to pass, whether it be in the office or on the farm. A man should live on a farm to make things give out an an increase just because he is there. A few farmers still belittle education because it makes a man stuck up. They say "Oh he is a fiddling scientist, but there is nothing in him." When you find a man who loads up knowledge to put it upon his back and carry it around with him for display, you will find him a very tiresome person. (Laughter.) But if you find a man who gets knowledge only to use it and keep it under his feet he is deserving of and will receive respect. I want to say to the young man here that knowledge is power to a man just as fuel is power to an engine. You may have a big engine, magnificently prepared by the skill of the ablest mechanics, but if there is no fuel in the furnace box there will be no power. The boy who goes through life and gets no instruction about his own calling is just as magnificently constructed, but he has no power because he has not possessed himself of the energy of knowledge. Get knowledge, not to carry it about, but to make men better, more useful and more comfortable because of your having it.

Now just a few words about the present needs and how they can be met. The Government of Ontario has authorised the introduction into the public schools of a text book on agriculture. That I consider one of the greatest strides in the right direction ever made by the Government. It is a book costing only 40 cents, but it is a compendium of agricultural information, the equal of which has not before been printed. The boys of this province will be all the better for reading this book; they will farm better because of its help. I hope every Board of School Trustees will insist upon having it put into their school, for the good of the little boys, the bigger boys and the old boys. I do not know a better way of spending 40 cents than by buying that book, and I have no royalty on it. (Laughter.) Then there is the agricultural press, but with our 200,000 farmers there is a circulation of only 20,000, or about one in every ten homes—a bad state of things. Man's mind needs food, but that brain food should no more be borrowed than his breakfast should be. Such a breakfast would not taste very good. Do not borrow your agricultural paper; pay for it. We have also our Farmers' Institutes, the existence of which has done more than anything else in the past ten years to stimulate better farming. Then we have our Dairy and Creamery Conventions, and last of all our Experimental Stations, to send the kindly light of information into the poor homes, as well as into the homes of the wealthy and enterprising. At Guelph the Ontario Government has had an experiment station for sixteen years, and it has rendered good service to the province. The Dominion Experiment Stations are to-day doing equally good work for all the provinces. In connection with this system there are a number of pupils who do not live at its centres, whom we may call non-resident pupils. They are expected to do all they can to assist in the work of the Department. They are the farmers of Canada, and it is inspiration to a man to think that 3,000,000 non-resident pupils are looking to him to play the part of one giving them helpful knowledge. The farmers are said to be seven-tenths of the people, and if you can get them to have confidence in and co-operate with each other in their study and work, you will have them bound together in a nationality which will make them strong and great. Individually, alone, each farmer cannot do much. I have watched a boy blowing soap bubbles and floating them into the air—such little things—glistening, sparkling. There was so little water that when one burst I could not see it. I began to wonder what a soap bubble would look like if it were as large as a waggon wheel. Perhaps I could then see some of those wonderful molecules. But Tyndall says that if a

bubble were magnified to the size of the earth those molecules might be seen about the size of No. 6 shot. Taken singly and alone, these infinitesimally wee units of matter cannot do much. Let us see an evidence of their power in united action. A quart of water—all made up of these inconceivably little molecules—is put into a strong iron vessel, which it quite fills. The sides of the receptacle are as thick and strong as the acquired experience of centuries of metal working can make them. The small opening is securely closed. The water is made to freeze. These little molecules seem to turn a little, and, when shoulder, to shoulder they all push together for more room for themselves, the strong vessel is burst like an egg shell. Let farmers co-operate for ends that are just and objects that are for the common good, and nothing can hinder their success. Education in concerted action is their great need ; not for coercive application, but for mutual help in bettering their avocation, their circumstances and themselves.

The speaker then went on to describe the work of the experiment stations conducted by the Dominion Government, painting in beautiful language some of the charming scenery in the provinces east and west, and concluded in the following words : We have in this country every natural resource that the heart of man can desire, and to realise upon their power of service for our national development we have only to put our skill into practice. I trust that all the educational helps to agriculture mentioned this evening may have plentiful fruitage, and such gatherings as this will not be in vain. May we all with one united effort try to make this Canada of ours prosperous, that our land may be filled with happy homes, kindly hearts and a strong manhood.

MENTAL CULTURE AND AGRICULTURE.

Mr. Sydney Fisher, M.P. for Brome, after a complimentary allusion to the eloquence of the previous speaker, said : Our friend, the Hon. Minister of Agriculture, has told you that I came up here from Quebec for instruction. I have indeed come here for agricultural education, and so far as I have seen of it this Dairymen's Convention is a very good school to come to. It has been my good fortune to listen on several occasions to some of the gentlemen who have spoken to you, but never to greater profit than during the present Convention. I have said to the educationists of my province some things which I would not undertake to say to the educationists of the province of Ontario, and above all in the absence of my friend Hon. G. W. Ross, your Minister of Education, who has so much at heart your educational system and who is so justly proud of it. I fear that the educational system of our country has tended to lead our youth away from the farm, and I believe this is a reproach which should cease in the future. It has been a national misfortune that so strong a tendency toward city life on the part of our rural youth has prevailed of late. The whole trend of our schools has been to turn our boys away from agriculture rather than towards it. I speak more especially of those young men who are a little more ambitious than their fellows. They have had some success at primary schools, then at the academies and finally at the universities ; and the tendency of all they have learned at these institutions is to crowd them into the professions There is too much competition already in the commercial and professional world, but the great lands of our country are crying out for men to fill them. Our Governments are trying to bring men from the crowded centres of Europe to come and work our soil. We do not want immigrants to our cities, but farmers with capital. Still the whole educational system of our country has been tending to drive our young men from the country to the cities. But I am glad to say that a successful attempt has been made to change this condition of affairs, and all honor should be given to your educational system here for that improvement. You are the first in the Dominion of Canada to put into the hands of the youth of the country such a work as Prof. Robertson has described this evening. I, too can say, as the previous speaker has said, that the putting of that work into the common schools of the province is one of the best things that has been done in the Dominion of Canada for years. It used to be thought that only the stupid boys should remain on the farm, and that the bright lads should go to the cities. Our clever young men have left the farms and gone into the cities because they wanted to attain high positions and be among the first in the land. Heretofore we have been disposed to look with envy upon

the men whose hands were driving quills, and who were able from one year's end to the other to drive around the city wearing tall hats. But these are not the men who have developed the country. It is the men who have been 70 per cent. of the people; the men who consume the greater part of the imports of this country—the men who till the soil. And I am glad to know that while in the past the other callings have had the main credit the people of the country are now beginning to honor the farmers. There is Gov. Hoard, essentially a farmer, a man who has arrived at his present high position by force of his ability. We have with us to night also Mr. Thomas Ballantyne, a gentleman who has occupied for a long time an honored place among the people of Ontario. And the farmers should be proud of the fact that they have so fitting a representative in the Cabinet as the Hon. Mr. Dryden. When I came to man's estate seventeen years ago I bought a farm, and have been learning all that I could about agriculture, but I have much to learn yet, and have come here to gain knowledge. There is no calling, not even medicine or the law, where there is more scope for the exercise of a liberal education than in agriculture. Farming is yet to hold a higher position. There are new conditions and circumstances arising, which demand changes in the business. There was a time when we had a virgin soil, but we have abused the land and it has become exhausted. In consequence of that exhaustion we must apply the best intelligence for the recuperation of the soil so as to be able to compete with other lands. Our forefathers were able to scratch the land and produce abundance, but we have to try many means in order to get an increase. We have the competition of the whole world, owing to new modes of transportation. India, Australia, and Asia are seeking wider fields for disposing of their produce. We may not be able to control prices, but we can apply ourselves to the best methods of production, to lessening the cost of that production and so meet competition with better prospects of success. Such meetings as we are now having are the best means of education along the lines I have referred to. I am able to come here and get the benefit of the labor and knowledge and experiments of the more intelligent men who practice agriculture. You can also go to the gatherings in the west, and you have here some representatives from that quarter. The effect of such meetings as these, with their eminently practical discussions, is to improve the general make of our cheese product, so that when once the article is known to come from Canada it will not be necessary for it to pass any further examination but it will be taken simply upon the fact that it has come from this country. Canada to-day occupies the very highest position as a manufacturer of cheese. Our professional men have not been able to put Canada in the van, but our cheesemakers have placed us in the very forefront. I trust that when I go home I will be able to give such a report of this meeting as will encourage my neighbours to imitate the good work you have done here. What I have learned to day has amply repaid me for my trip here.

After the passing of votes of thanks to all who had assisted in the evening's proceedings the convention adjourned until the following morning.

SECOND DAY—MORNING SESSION.

After bringing the meeting to order the President said: I have great pleasure in calling upon Gov. Hoard to address us this morning. He was to have spoken yesterday, but felt indisposed owing to not being in good health and having taken a long journey.

WINTER CARE OF COWS AND BREEDING.

Gov. Hoard, who was apparently in far from robust health, was most cordially received, and spoke as follows: I am a good deal this morning like Jimmy McGinnis's musket. He was a fellow soldier of mine, and one day he started off to do a little bit of skirmishing with an old-fashioned cartridge. Some of the boys had played a trick

upon Jimmy by doctoring his cartridges—the contents being half salt and half powder, and Jimmy declared that whenever the gun went off "it had a quare way of expressin' itself. Troth, and it sounded to me as if it was troubled with bronchatis." (Laughter.) That is how I feel to-day, having been taken with a severe attack of la grippe last December, and it has settled in my throat. You will excuse me, therefore, if I do not do justice to my subject. I will take for my topic this morning the winter care of cows. I find, particularly in the old dairy districts of New York and Canada, a great degree of indifference on the part of the average farmer concerning the winter care of his dairy stock. There seems to be an idea prevalent amongst cow owners that almost any kind of usage will do. For instance, I was attending a dairy convention in New York State on the 15th of December. In riding through one of the counties I passed hundreds of dairy farms and saw cows wandering in the fields while the thermometer was down to zero. I saw them turned out at nine o'clock in the morning, and kept out until four o'clock in the afternoon. And that appeared to be the general custom with those farmers. In asking some of them afterwards why they handled their cattle in this way, they told me it was because they wanted to give them exercise, and that the cows needed exercise. I asked them if they had ever summed up the cost of trying to warm a forty acre field in the winter time with good food, and they said they never had. I asked them if they had really determined whether they had learned the temperature of that field, and they said they never had. I asked them if they had investigated the temperature of the cows, and they said they never had. Here were old farmers, who for years had been grumbling about the hard times, and swearing that the west had cleaned them out, and I said to them: "You can go into Jefferson county, Wisconsin, twenty years old, and I dare you to find such an example as you are setting, turning a cow out on a cold winter's day and leaving her to wander over the dreary fields." Some men never realise that it takes more food to keep their cows if they are to be exposed to the cold. There is not a dairyman here present but knows that a cow well wintered is considerably increased in her productive powers in the summer. The dairymen of this section are largely engaged in the production of summer milk, but not one in a hundred is handling winter milk. Your cow is a boarder in the winter. Now, condition is a very important matter in the case of a cow. The dairy cow is a working machine, and if you are to have a well-ordered machine for next summer's work you must winter her honestly. We are making merchandise of that cow's maternity, but do we treat her from the standpoint of a mother? No, we treat her as a bullock. We are dealing with the maternal functions, and yet we are perfectly indifferent to the laws which govern a female. My wife, who is the mother of three boys, has been to me a potent agent in the study of this question. And I would say if you want to know how to treat a cow you must first study how to treat a woman. First study the human mother, and when you have got at the laws which govern her in the exercise of her maternity you have also arrived at the laws which govern the bovine mother. My wife gave me my first lesson regarding these laws of motherhood. One day we were driving a long distance, and she had an infant in her arms, when she complained of feeling cold, and said that it was too bad, as the baby would have to suffer from her chill. I asked her how that could be, and she said "Why it means less milk for baby." I then enquired if chilling had the effect of lessening the secretion of milk, and she said I was a very stupid man if I did not know that much. (Laughter.) And instantly my mind reached out to thousands of dairy farmers who never had dreamed of it any more than I had. That woman taught me there a very important lesson. She taught me that cold invariably caused a shrinking or weakening of the lacteal functions of the mother. That led me twenty-three years ago to my first investigation concerning the use of warm water. I said then to my wife, "What will you do to regain your wonted powers as a mother?" She replied, "When I get home I will take some warm drink. I shall endeavor by the use of heat and a little gentle stimulant to recover my lost power and have milk for my child." That showed me a principle upon which every keeper of the bovine mother could proceed, and led me to the use of warm water. I think I was the first to recommend the use of warm water for dairy stock in the winter. I plumed myself upon the idea that I had discovered something big, but every old woman in the land knew it long before I did. And yet we

stupid men go along with an idea of handling this bovine mother against our interests, while our own wives teach us something better every day in the week. This question of handling dairy cattle is a very close one and demands particular attention. Now, suppose you divide your duty as a dairyman. First you ought to be a good breeder. The day has come when every dairyman must go down who does not address himself to this question of keeping a better cow. Competition is crowding men to the wall. I have just been reading Gen. Booth's "In Darkest England," and it is an awful picture of human competition—of competition in flesh and blood. Human competition is crowding us also. You will have to make butter and cheese at lower prices than in the past. You must not flatter yourselves that you will get old fashioned prices, for they will never return again. If the farmer would get that cursed idea out of his head that he is a producer, and realise that he is a manufacturer; that there is no such thing as raw material with him; that the pound of wool is his manufactured product; that the load of cordwood is his manufactured product; that the pound of beef, or milk, or cheese, or butter is his manufactured product;—if he would then apply himself to the finer problems and economies which bring money, as studied by other manufacturers, he would soon rise to the dignity of his noble profession, and more practical results would attend his labors. Why do the farmers not more closely study the economy of a good cow? The actual record of Canada indicts the intelligence of its dairymen. It is a square indictment. And it is so in Wisconsin and in New York state. Here are men doing business with cows which barely pay for their feed. Your average production of milk in this province is only about 3,000 lb a year, and I heard Mr. Ballantyne say that he has a heifer that gave him last year, with her first calf, over 5,000 lb. Dairying cannot be prosperous unless you start with the idea that the farmer must become a breeder, and have a proper ideal of a good cow. You will have to stop this senseless and wicked principle of putting a premium on dishonesty. I tell you that when you have taken in milk by the pound, and have allowed a man, who would cheat, or had a cheating cow, to get as much for his milk as the man who dealt with you honestly you put a premium on that unfair dealing. Human nature in Canada, as is the case of Wisconsin, is dangerously weak. (Laughter.) I had a test in our factory recently. I did not let any man know who his neighbour was. I went to No. 8 and said "There is No. 11, whose milk is worth five lb. to the hundred, and yours is worth only three. Do you think you should have as much dividend out of this factory as that man who gives two lb. a hundred more?" He said, "I don't think the test is right." "Well," I replied, "here is the test of every patron in the factory; the test is by the churn, and the churn is two pounds ahead." And some of you have been paying a premium to a man who was breeding a cow that was no better than a pump. (Laughter.) You are putting a premium upon the dishonesty of your people.

A Voice.—Yes.

Gov. Hoard.—Well, there is one Lot in Sodom. (Laughter.) It goes hard with Sodom. (Renewed laughter.) This premium business is well illustrated by the remark of an old German who lived near where I once resided, and he was a genuine old Dutch philosopher. One day I saw him leading a two-year-old heifer back from the fair. I asked him if he got a premium. He looked black and said: "You know what I tinks? Vell, I tinks dhis: If a man has the bestest heifer and go to der gounty fair, if he don't got a goot head he don't got a bremium." (Laughter.) He found out that a good head counted for something. People are seeing that quantity, not quality, is established as the rule, and they are making their fortunes at the expense of the man who gives quality in his milk. This principle has demoralised the business and impaired the moral sense of the people. The first thing to do is to teach the farmer that he needs to become a breeder of a dairy cow; that he can produce a cow to his own liking, and that his cow must be a cow that gives milk blest of God and not of the pump. (Laughter and applause.) Why cannot we forecast this question? Why cannot we exercise the brains of intelligent men, and, foreseeing the evil, escape it? We must produce milk more cheaply, and how can we do it? If we have formed erroneous opinions of the economics of a cow we shall be punished by these opinions. If we have deluded ourselves with the notion that there is

no waste in having a cow that weighs 1,500 doing the same business as a cow that weighs 900 or 1,000 lb. there is no help for us. You cannot keep a 1,500 cow on the same food as a cow that weighs only 900. It may be said that one man who weighs only 100 lb. eats more than another who weighs 200, but that is no answer. We must divide this question of the food of support from the food of production. The food of support is that which goes to support the carcass, and it certainly costs less to feed a cow weighing 900 than one that weighs 1,500, for what the larger animal must eat to support its greater weight the smaller cow can turn into milk. This one fact is an important point. I have been an auctioneer, and have sold herds of cows, and have seen farmers pay more for a beefy animal but not much cow than for one all cow from horns to heels—yes, sometimes twice as much. Now, how are we to reach such farmers? Over in Wisconsin we are trying to make each factory a centre of dairy knowledge. We are going to make them schools, from which information will be issued to a degree never before practiced by us. And if we do not do something of that kind the farmer must succumb. You may put your hands into your virtuous cheap factory pockets, but as sure as there is a God in Heaven your breath will be taken away. Competition is crowding us from every quarter and cheaper food means inevitable progress and influence. If we are to make any profit on our butter next year, it must be by decreasing the cost of its production. Let me suppose that I have two cows in my barnyard, each one giving 3,000 lb. of milk. I cannot support the carcass of these cows for less than $22 a year. Here is $44 for the support of these two cows, and they give me 6,000 lb. of milk. But I have another cow that gives me 6,000 lb. of milk. I support her carcass for $22, or half as much for her 6,000 lb. of milk as it costs to sustain the other two cows, yielding between them the same quantity of milk. Why has not a conviction gone abroad to reduce the number of cows and increase the production? One man asked me the other day, "Where in Heaven will we land when all the cows produce 300 lb. of butter? There will be so much butter that no man will be able to stand up. The country will be fairly slippery with it. What will you do!" I said, "My man, when you have a 300 lb. butter cow, she does the same business as two 150 lb. cows, and you are doing the same amount of business at half the cost." We must push this question and let farmers see the benefit of breeding a dairy cow, and getting the same quantity of milk from one-half the number of machines. The two cows that give me 6,000 lb. of milk cost for support, $44. What did milk average for cheese-making last year.

A Voice.—About 70 cents.

Gov. Hoard.—Well, that is only $21 per cow. Now, I cannot even support a cow for a year short of $22, and yet the value of your average production is only $21. Now supposing again I had a cow that gave me 6,000 lb. of milk. The average cost would then be how much? The same for supporting the carcass. She might take an increased amount of food but she would return it to me in milk and not in mere existence. There is a heap of difference, as the Arkansas man said, in forty acres of sky and the same amount of solid land. (Laughter.) We have a lot of men on the other side who are clamoring against the tariff, and the railways and the trusts and keeping 3,000 lb. cows. And they are taking it out in clamoring.

One more point. We must learn how to breed a good cow. What constitutes a first-class cow? We must get the idea out of our heads that there is a cheese cow and a butter cow and a dairy cow. Well, there is a very profitable cheese cow, and if you can only rob your neighbours you will get rich on it. You may have a good cheese cow if every other patron has a good butter cow. (Laughter and applause.) Then comes the question of handling. In nine out of ten of our stables the manure freezes in winter. I have taken the actual census of it. I regret that, owing to the tariff, I was unable to bring with me a model of a good stable. When I was elected Governor of Wisconsin I was full of reform, and the first reform I executed was to put that stable into the executive barn. I put in a couple of cows, and when any one came in and talked dairying to me I sent them out to look at that stable. We must have comfortable, clean stables. Each cow in that stable is allotted 3½ feet of space, and she can lie in it

without any part of her body being in the manure. I have one Guernsey cow splashed with white and she is just as clean looking in that stable as in a June pasture. That one word "comfort" must be well considered and looked after with a cow or she will take her revenge out of you. I was very much amused the other day at the way some men refuse to get knowledge. In Madison county, New York, where I was raised, there is one silo, and the farmers go and look at it critically, a sort of sideway glance; and that one silo still remains, a lone exhibition of one man's good sense, while the others are expensively speculating as to whether or not they will try it too. In the town [or township] where I live there are 45 silos, and in the town adjacent 65, and the other day one of the farmers wrote to the superintendent of the farmers' institute, "You do not need to talk silos. Talk about something beyond. That is conquered ground. Every man who has not a silo is thinking about building one, and those who have one are thinking of enlarging." Farmers need to be conservative, mind you, but there are some things which have been proved. The silo is an established fact. The man who has not come to the conclusion that there is a better cow than the 3,000 lb. animal, and that he can produce her, is a back number. The man who has not come to the conclusion that there is a cheaper and more comfortable and profitable way of caring for his cows is a back number. If he has not learned that there is a cheaper way of feeding his cows he is in the shade. Can we afford to be back numbers and remain in the shade? Knowledge is worth something; there are dollars and cents in it. I feel that some men are getting into the condition described by an Irish friend of mine. He came to me a year or two ago during a great drouth and I said to him, "Michael, it is very dry." "Yes, sur," said he, "It is as dhry as a limeburner's wig." Said I, "I see the wells are giving out." "Yes, it's dhry." "Well," I went on to remark, "what are you going to do?" "Shure, an' if it doesn't rain soon I'll have to soak my pigs to make them hould the shwill." (Laughter.) That dry-cracked pig is typical of many of us. We need to be more soaked with knowledge and intelligence if we are ever going to hold dollars and cents.

PREPARING CHEESE FOR MARKET.

Mr. A. A. Ayer, of Montreal, after a kindly personal allusion to the President, congratulated the Association upon the splendid gathering before him, and also upon the fact that the Minister of Agriculture, in addition to other able speakers, was present. He trusted that the outgrowth of the visit of the honorable gentleman would be the development of some schemes to aid the dairymen of the province to still further advance their great industry. You have heard it said that the western peninsula is the garden of Canada. The people of Brockville could scarcely make that claim for their locality. Nature has not done as much for its soil as she has done for western Ontario. But she has done much for the men of this section. They have been hardy and energetic, and their enterprise and industry have worked a wonderful improvement in their surroundings during the past twenty years. As I listened to the excellent counsel you have been receiving regarding the improvement of the dairy farm, the best crops to grow for feeding, the new and progressive methods of handling stock in winter, and above all the importance of manure. I was reminded of the story told of Mr. Samuel Briggs, of Manchester, who had brought his land to a very high state of efficiency. It is said that in a raffle for a donkey he found himself half-owner of the animal, and as the other man would not sell out his interest, the gentleman first named proposed that his partner might take the front half for his share, while he himself took the tail end—the part that gave the manure. (Laughter and applause.) The manure end is too often slighted, but it means the vitality of the land. When the figures of dairy product were read to-day I was led to think of thirty years ago when a product of 175 lb. of butter per cow was considered something wonderful. I remember that my father found a cow that was a good mother, giving 60 lb. of milk a day, and he said, "That's the cow to breed from." That cow had twins several times, and as fortune would have it they were always heifer

calves, and soon we had a number of dairy cows all tracing back to the one mother, and all good milkers. Water was constantly before our cows, and that water was luke warm. My father did not have a silo, but he raised a good many acres of corn, and the native corn grew ten feet high on that farm. The corn was mixed with straw and cut up and fed to the cows. I am certain of this one thing, that a cow will not give much milk if you do not feed her well and keep her warm. There are a great many cows supposed to be poor milkers that would be good dairy animals if they were properly housed and fed.

I would like to say a little upon some of the aspects of the cheese business with which I am more directly acquainted. Some men do not like to hear of their faults, but that is not the way with you or you would not have made the advancement you have in the past few years. The next great step forward should be the improvement in the flavor of your cheese. I know you have improved in this respect, but not in the same proportion as you otherwise have in your make. I believe there are more cheese defective in flavor than in any other one thing.

Use the Aerator. It will be nothing short of a sin if every farmer does not put one in. There is no way in which you can make more advancement than in getting factories to use pure milk well aerated. You would not expect to get a cow that gives 6,000 lb. of milk for the same money that would buy one that gives only 3,000 lb. Then why should you hesitate to pay two or three dollars for an aerator, and so have milk that will make perfect, well flavored cheese? There is the tendency for a larger cheese. The bulk of the best commercial cheese should weigh 70 to 84 lb, although some weigh 100 to 120 lb. And why? Because the market always wants something that is difficult to make. But the average farmer says: "How do they expect us to keep up to all these things? It will ruin me if I attempt to do all that is expected of me." And then he goes home and does not even try what he can do. And that reminds me of a little story. A colored man down South was driving a mule one day when it fell to the ground and refused to get up A doctor came along and asked what was the matter. The darkey replied: "Dis mule done lay down, and he won't go. I've licked him and coaxed him, but he won't go no how." The doctor took out a syringe and gave the mule a strong hypodermic injection, when it got up and started off at a lively gait before his owner could get aboard. The negro raced after the mule, the doctor following. After a while the man of medicine came up to the darkey who was out of breath, when the latter said: "Say boss, can't you give me one of dem *interjections* so dat I may be able to catch up to dat dar mule?" (Laughter) There are some farmers who require that treatment to help them catch up to their neighbors. Mr. Fisher has very modestly told you that he has come up here to learn. If you should miss some of your best makers, you will know where to find them. You must not under-rate the Eastern Townships, because they comprise one of the best watered and best grazing sections of this country, and no place is more suitable for successful dairying. They have been making splendid butter there for years, and of late they have gone into the manufacture of cheese. The cows they have there have been bred from Guernseys and Jerseys in days gone by. They can afford to sell cheese for less than you get for yours, and still pay the farmers just as much for the milk.

You ask me about the system of selling. You arrange your own system and I shall adapt myself to it. I had thought, however, that if the factory men who spend so much time in trying to get the extra 1-16 of a cent, would spend as much time in endeavoring to improve the quality of their cheese, *the article would soon sell itself.* If you want to get more money for your cheese, *spend your time* and *thought* in deciding how the cows will get more and cheaper food; that you will get better cows, better milk, better dairies and better dairy utensils. You must not imagine that we buyers are in the business for the simple pleasure of it. We are there to make money. You dairymen can help yourselves and help us in a very simple way. It cost our firm $5,000 last year to cooper or repair boxes alone. Is not that a ridiculous condition of affairs? If I were a factoryman I would make a 75 lb. cheese, and then I could afford to get a better box than I could put on a 60 lb. cheese. I would get samples from all the box-makers, and select the one that would carry to China. You should have as good boxes here as they have

in the Ingersoll district (and I am sorry to say that the Ingersoll boxes are not as good as they were two or three years ago). If you would have us pay you more money for your cheese, we must be able to handle your make with less cost to ourselves. We take every cheese out of the box when it comes to Montreal. And why? Simply because we we cannot trust you to leave out any defective cheese, and so every cheese must be taken out of the box. If you have a sour cheese or an off-flavored cheese, it is sure to be put in without being marked. You can depend on it that the honest factoryman will always get an honest price for his honest make. We think the fair plan is to pay a high price for good cheese, and pay for poor cheese just what they are worth.

A MEMBER.—What is your opinion about stencilling cheese?

Mr. AYER.—We would like to have the weights stencilled on. Some can make good figures with pencil, but as a rule we have to make the weights over again. As to putting factory brands on cheesee, to be perfectly frank with you it is almost impossible to do so. Every large house on the other side wants us to put their own registered brand on the cheese, and that is because the dealer does not want to have Jones, or Smith's name on the goods he handles but his own.

A MEMBER.—How do you weigh your cheese?

Mr. AYER.—We *do not weigh them.* The public weigher does it all and we take his weights.

The PRESIDENT.—Your cheese is weighed at the factory. You put it into a dry box, and you might as well expect a sponge to weigh as much some days afterwards.

Mr. AYER.—In my experience there is not one factory out of three that has a perfectly correct scale and where they know how to weigh properly. The majority of factories are not built on a level, and if your scales are not on a level you must not expect them to weigh fairly.

A MEMBER.—And then it cannot weigh the milk correctly?

Mr. AYER.—But you do not move your scales all over the factory for milk. In closing this address I would desire to impress upon you the importance of four things. First, have tight-fitting boxes; secondly, use plenty of nails in fastening the box; thirdly, be sure that the box is not too tall for the cheese; and, fourthly, pay the boxmaker two to three cents each more for your boxes so he can afford to give you a perfect box.

A PLEA FOR DAIRY SCHOOLS.

Mr. THOMAS BALLANTYNE, M.P.P., was next introduced by the President and said: I can assure you that it gives me sincere pleasure to see so many representative dairymen and buyers here to-day. I have been connected with dairying from its commencement in this country. I shipped the first hundred of cheese on the Grand Trunk Railway, and I was present at the first Dairymen's Convention held in Canada, which met at Ingersoll. I have been on the Board ever since, but whether I have been of service or not I cannot say. I do not think that I need do much in the way of trying to enlighten you along the old lines. We have all got over the first stage. But since my return from Great Britain recently I have been much impressed with the thought that if we are to continue improving the next onward move must be the establishing of dairy schools or more properly dairy experimental stations for educational purposes. Let us take a glance at the history of the industry with us. The manufacture of cheese was first carried on in Oneida and Herkimer counties in the State of New York. Soon we saw the American dairymen coming over to Canada, selecting our best milking cows and driving them across the lines, for in those days we had the old Reciprocity Treaty. When we saw the droves of cows going over there we asked ourselves, "Why should we not use them for cheese-making over here? We will have the same market for our surplus product, and if it pays them it surely ought to pay us." About that time the late Harvey Farrington, a native of Herkimer county, N.Y., settled in the county of Oxford in Western Ontario, and no man was better fitted to introduce the business of cheese-making into a locality. He was one of the finest men I ever knew. He was philanthropic and patriotic.

He had no narrow views, and anything he knew he was willing to impart to others. I honor the memory of Harvey Farrington. His views regarding cheese factories spread rapidly, and in a few years we were making cheese all over the country. But it was selling at a less price than that of Oneida and Herkimer counties, as it was of inferior quality. As I visited the cheese districts on both sides of the line I determined to learn how to produce the finest quality of goods, Canadian cheese then being at a discount in Liverpool, although a few factories here and there were making superior quality. We solved the problem, and to-day Canadian cheese is at a premium. We had our conventions, with papers and speeches and discussions, all very good in their way, but I never knew a first-class cheese maker who was made so merely because of his attendance at conventions. Actual work—demonstration—is the best means of instruction. The Western Dairymen's Association determined that it would not do for only a few factories to have a high reputation and sell at the highest prices. The makers then were anxious to improve, and were making an honest endeavor to do so. The question suggested itself to us, should we not employ some one to visit the factories and give instruction to makers? I wrote a resolution recommending such a move, and it was carried at one of our meetings. We were not altogether fortunate in the selection of the first person chosen; so much so that the Board was almost solid against continuing an instructor. In fact I was the only one the other way inclined, and I agreed that if the next attempt was not successful that I would pay the expense myself. He corrected his mistakes, and since that time a general improvement has been noticed. Our cheese soon sold for a cent or a cent and a half higher than Brockville cheese. But you followed us along this line of inspection and instruction, and now your cheese is getting as high a price as ours. And you have been making fine butter here when we were making butter that was unsaleable.

But let me go a little further. A few years ago when visiting the dairy districts of Scotland I was struck with the low average quality of their goods. There was every attention to cleanliness, and they had advantages which we have not here, yet their cheese was inferior. About that time a Scotch gentleman happened to be visiting me in Stratford, and he asked me what they could do to improve. I told him to form an association and get the best and most practical men they had to come together and discuss matters. I pointed out that it was the attention to detail that needed to be studied. Well, they decided to try and form an association. And let me here show you how small a matter may lead to great consequences. I gave this gentleman a cheese a year old and he distributed to his neighbors. "Here is Canadian cheese," he told them. "We have nothing like it. We must also improve." They formed a Dairy Association, which had its first meeting in Ayr at which I was present, with the Earl of Stairs in the chair. Acting upon our experience and suggestions they decided to appoint an instructor to visit the different districts giving practical lessons in cheese-making, and applied to myself to send them one, and there have been three different men, all from Canada, doing that kind of work, followed by the establishment of a dairy school at Kilmarnock in charge of Mr. Drummond, a Canadian whom I engaged for them. The result is the immense improvement in the quality of their cheese as shown by the recent dairy fairs held in London and Kilmarnock, in London taking every prize (except one) for which they could compete, including the Lord Mayor's cup. The newspapers in England and Scotland recognise our system as taught by Mr. Drummond and others as the cause of their great improvement, making a difference in prices of at least 15s. per cwt. At the dairy fair in London there were 109 entries of cheese, of which no fewer than 84 were from the pupils of our Canadian system.

Mr. Ballantyne then read extracts from *The North British Agriculturist*, *The Scotchman* and *Glasgow Herald*, these papers all giving credit for the great improvement in the quality to our Canadian instructors. That has advertised Canada more effectually than through any other means that have been used.

I visited several places in Scotland during the year past and was struck with the uniformity, the high quality and the great improvement generally in the character of the goods compared with former years. I can remember when only a few years ago

our finest fall Canadian cheese would sell in London in preference to the Scotch make by 10s. or 15s. per cwt. When I was there this year they were paying for some of their home make 60s. per cwt., whilst our best Canadian was selling at from 44s. to 45s. per cwt., and I found some goods from a certain combination going at 43s. That is the result of teaching. Meeting a retailer one day I asked him why there was so much difference in the price as there was not a relative difference in the quality. He said: "I would like to sell the Canadian; it is a sixpenny cut and I have good profit in it, while I have to sell the other at eightpence. but then there is a perfection about it." I said to him, "How is it?" He replied, "The working people are well off now and they want the best." That is the reason. The cheese and butter we sold twenty years ago, some of it as strong as a horse's hind leg, cannot be readily disposed of now. While we must make more milk and cheaper milk, we must also attend to the make. Great Britain is now getting food from all parts of the world, and her providers are carefully studying her taste. She has been inundated with fresh pork from Norway and Sweden which retailed at 4¾d. per lb.; but depend upon it, the better the cheese the more of it will be consumed. I have noticed while driving for two or three days through a dairy district that there is an extra richness in the Old Country cheese. There appeared to be a large percentage of butter fat present. The cows were exclusively pure Ayrshires, and you can rest assured that they would not be bothered with a 3,000 lb. yielder. But they did not stint these cows in their food, for, although there was plenty of rich grass, they were feeding the animals drumhead cabbage and beans. There is no waste in those factories, and the curd could not be more carefully manipulated. Meeting the factor of the Duke of Portland he remarked to me, "The rental roll is not behind, and it is all owing to the improvement of the cheese," and consequent high price for the product. We have not been sufficiently impressing upon the people the importance of preventing the cream from rising. If once separated the milk can never afterwards be thoroughly assimilated. With a view to assisting the patrons of one of my own factories I gave them an aerator last year as a present, but I fear that on account of the cool weather they did not use it more than once on each lot of milk, and milk must be stirred sufficiently to prevent much separation of the cream. The rennet theory as an agent in the curing of cheese was considered an important factor, especially by the late Prof. Arnold, until it was exploded by Prof. Robertson whilst at the Ontario Agricultural College. I believe that our cheese has been selling at something more than a cent a pound higher than at Little Falls, New York. We have made improvements. Educational influences have been at work. Now, if we had a dairy school with good men in charge, cheese-makers wanting to be perfected in their business could spend a few days there and get advantage of the highest instruction. Factory men do not want to listen to second class men who may visit them, although I have known much improvement to result from the visits of some of our inspectors. But only the very best men could take hold of this experimental work. I know that our new Professor of Agriculture is very desirous of assisting us, and the country would sustain any action on his part which would aid in the development of agricultural knowledge of this character. My opinion is that we should have two schools in the province, east and west, to which makers could come for improvement. I do not mean that we would try to make them thorough dairymen, but it should be a place where makers could come and learn more. It takes a year or two to develop a good maker. Last year there was an immense quantity of very ordinary cheese in the west. But we had some very fine goods, too, and what one can do all may do. There is no maker who cannot spare a day or two to learn something at one of these dairy schools. It would be a school of enquiry for such a man. He would find his visit meant a step onward in still further improvement. The result of the shows held in Scotland have confirmed me in my views regarding the advisability of dairy schools. And you know that the trend of our conventions have been in this direction. It used to be nearly all talk about floating curds, building factories, etc., but we are now getting past that. However, we can see even now the benefits of these discussions on curd and rennet in the past.

The meeting then adjourned until the afternoon.

SECOND DAY—AFTERNOON SESSION.

The convention was called to order at two o'clock by Mr. PLATT HINMAN, who said: The president upon leaving the chair at noon said that it was doubtful if he would be able to be here, and desired me to take the chair as second vice-president. It is desirable that we should have the reports of committees at once so as to give us time to hear the addresses.

The following report of the nominating committee was then read and adopted:

REPORT OF NOMINATING COMMITTEE.

President.—William Eager, Morrisburg.

Vice-President.—P. Hinman, Grafton.

Second Vice-President.—William Bissell, Algonquin.

Directors,—Div. No. 1, E. Kidd; No. 2, John McTavish, Van Camp; No. 3, Richard Murphy, Elgin; No. 4, D. Vandewater; Chatterton; No. 5, T. B. Carlaw, Warkworth; No. 6, H. Wade, Toronto.

Auditors.—James G. Foster, Moira, and M. K. Evertt, Easton's Corners.

Mr. HINMAN.—No man is more sorry than I that Mr. McCrae, our late Vice-president has been forced to leave his home and go away for his health, as we believed that he would have been the next President. Mr. McCrae not being available, one of your oldest directors has been called to the presidency. I believe you have done wisely in accepting the report of the Nominating Committee. I shall now call upon the President elect to take the chair.

Mr. EAGER—You have conferred a great honor upon me gentlemen, in electing me president of this Association. I shall endeavor to promote the interests of the Association to the best of my ability and judgment. I ask your sympathy and your co-operation, and if I receive these I feel hopeful of having some degree of success in anything we may put our hand to. (Applause.)

Other reports were called for, but the committees were not prepared to respond.

THE BOXING OF CHEESE.

Mr. AYER, of Montreal, was then called upon to give a fuller description of methods of handling cheese.

I have been asked to say something more about this question of the boxing of cheese, as I did not go as fully into the matter this morning as some members of the Association desired. As to the kind of box required you need in the first place one having more nails. Use plenty of nails. Many cheese boxes go to pieces by the time they reach Montreal. You will often see a box with perhaps only five, six or seven nails in it. There should never be less than twelve nails in a lap, and there should be fifteen nails on the lid and another fifteen on the bottom. A box that has less than forty-two nails is weak.

The boxes are generally made too high for the cheese. Either make your cheese bigger or your boxes smaller, but do not allow any waste in the box. The bottom rim should be narrower than the top one—say $1\frac{3}{4}$ inches on the bottom and $2\frac{1}{2}$ inches on the top. A box of cheese is handled or lifted on the average about twenty times before reaching England. If the box is so tight that you can jump on it without breaking it you may rest assured that that box will carry; but if the cheese is loose, the box being too large, it will break with anything like rough usage. I am asked about cap cloths. I favor their use, but do

not press them under the bandage, but press them over the bandage *and leave them on.* Do not grease them all over, but let them go to market as handsome as possible. I have seen boxes in Montreal in the warm weather with the grease oozing out of them. Please remember that just as soon as the box is stained the price of a cheese is depreciated, no matter what the real quality of the goods may be, for there is something in appearance and style in the cheese trade as well as in any other. The factory should be built so that heat will never be extreme. Do not place a cheese where it will fry out.

A MEMBER—Has not this same thing often resulted while in the cars in hot weather?

Mr. AYER—If the cheese is well packed in a ventilated car there will be no frying out in the cars. We do not let the cheese remain in the car any longer than possible, and as the car is moving the greater part of the time there is generally a sufficient current of air. See to it, however, that your cheese is got off from the station as soon as is possible after it is placed on board the car. Do not use black scale boards because they are cheap, but get the best you can procure. In hot weather double scale board your cheese, both at the top and bottom, and unless there is unusual heat your goods will not be injured by the high temperature.

A MEMBER.—The scale boards we use come from the buyers.

Mr. AYER—Then if they are poor in quality go for the buyers. Do not permit the cheapness of the furnishings to spoil your cheese. It does not pay to ruin a first-class cheese by using cheap furnishing. Make your goods up stylishly. There is no style in daubing your cheese all over with brands such as "This is a full cream cheese." "Register Number 1000." And another brand on the box, "The High Flyer Factory, Germanstown Station, John Jones maker." You might as well expect a man to buy a white coat and have it branded all over with the name of the dealer he bought it of or a description of the quality of cloth in the coat. We make only full cream cheese in this country.

Gov. HOARD—If John Jones makes a skim milk cheese we must brand it so. (Laughter and applause.)

Mr. AYER—There is an impression abroad that it does not matter if cheese gets wet, but if you saw the condition of some cheese in Montreal you would soon change your mind if you had been that way of thinking. The boxes should be covered with tarpaulin in rainy weather. If you have two scale boards and a good top cloth you can stand a good deal of wet. But let me say very plainly that a cheese with a single scale-board and no top cloth will lose a cent a pound in value if left exposed to the rain.

A MEMBER—Why should not factorymen's weights of cheese be taken universally

Mr. AYER—I believe it would be a premium to dishonesty if we were to take the figures of factory men. Some give proper weight, but others are inclined to be dishonest, and this method would leave no check on such. But if there is an intermediate person who has no interest in favoring either party, to come between you and us and the men in England, what can be fairer to both buyer and seller? As to brands on boxes, I repeat that we do not care to have factory brands on the boxes.

TEMPERAMENT IN THE DAIRY COW.

Gov. HOARD was warmly received as he rose to deliver his address on the above-named subject, which was illustrated by life-sized black and white pictures of various breeds of cattle. The speech was in the main a repetition of an address delivered in Ontario on one or two occasions, and which may be found in the reports of 1888 and 1889.

At the close of Mr. Hoard's address the following interesting colloquy took place:

Mr. KEELEY.—Do you approve of small-sized cows for milking?

Gov. HOARD.—I do not approve of large cows if I can get the small cow to do the same work. I do not believe that size is any indication of talent. What I am for is a cow's talent, be she big or little. But I consider that if I have a cow weighing 800 lb. and another weighing 1,200 lb., each giving 300 lb. of butter, I can make more on the 800 lb. cow, as it requires less feed.

Mr. KEELEY.—What I want to know is, what kind of cow is best for us?

Gov. HOARD.—If I did that you might fire up just as you would if I told you what kind of woman you should have. Men go according to their own taste generally. But if you want to pool with your neighbor and put your milk with his into a factory vat I can tell you. If you were a patron of mine in my own creamery, where we keep two sets of vats, one for the men who bring in rich milk and the other for the men who bring poor milk, and where we make up these two sets separately, I would say breed from the cow that gives the richest milk.

Mr. KEELEY.—I would like both quantity and quality.

Gov. HOARD.—You cannot get that. You cannot load your gun to hit it if it is a deer and miss it if it is a calf. (Laughter.) But this gentleman is on the line of a question that affects you and me. He wants to know which is the best cow. I wish you could shape matters so that if you had a cow that gave milk of good quality it would be all right; but unless quality is recognised in a factory I would advise you to get the animal that gives the most milk of any quality. We established a Jersey and a Guernsey vat in our creamery and said that any cow having 50 per cent. of Jersey or Guernsey blood might go into it. We kept the milk separate and made up the butter from each of these vats, and it has all sold at one price, but the amount of butter each 100 lb. of milk makes is kept separate. The Jersey and Guernsey vat returned $1.05, while the common milk realised 85c.

Mr. KEELEY.—The small cow is best for us.

A VOICE.—What when she is dead?

Gov. HOARD.—You have had your return from her if she has been breeding. Mr. McPherson, a patron of ours, has a herd of 35 cows, Jersey grades, and we paid him last year in cash $63 a head, and returned him his skim milk, for which we would have been willing to pay him last year $12 per cow. His herd averages in weight 900 lb. to the cow, but the average yield is about 6,000 lb. of milk. Mr. Goodrich's cows have averaged 375 lb. of butter. The great question to be decided is how to increase the production without increasing the number of cows.

A MEMBER.—This system of close inbreeding must tend to produce evil results.

Gov. HOARD.—It means intensified Jersey grades. You have intensified your strain. You have not a family of Jerseys that has not been made by inbreeding. But inbreeding is like a razor—it all depends upon how you hold it whether it cuts your beard or your throat. (Laughter and applause.) The Governor then proceeded to describe his stable, a mere verbal description of which it is impossible to give with clearness.

RE-ELECTION OF OFFICERS.

At the conclusion of the foregoing address Mr. WARRINGTON, the late president, rose to a question of privilege and took objection to the election of officers earlier in the afternoon during his temporary absence. After some observations from Mr. Hinman and Mr. Carlaw the matter was reconsidered upon motion of Mr. Derbyshire, seconded by Mr. James Bissell, that the original report be now received and adopted. No objection being made the motion was declared carried.

REPORTS OF INSPECTORS.

The reports of the inspectors and instructors were then called for in the following order:

INSPECTOR RUDDICK'S REPORT.

Mr. President and Gentlemen:

I herewith submit my report, as instructor and inspector, for the season of 1890.

The district over which I was appointed includes the counties of Prescott, Russell, Glengarry, Stormont, Dundas, and Grenville, with parts of Leeds, Lanark, and Carleton.

Sixty-eight factories applied for inspection and received in all eighty-eight visits. These factories are scattered all over this large territory, and it will be easily seen that, to cover the work entailed a vast amount of travelling which was often attended with a good deal of difficulty, and no little discomfort.

The names of the factories visited with the number of visits at each are as follows:

North Gower, 1; Manotick, 1; Burritt's Rapids, 1; St. Andrews, 1; Monklands, 1; Black River, 2; Mille Roches, 1; Hawkesbury, 1; White Globe No. 1, 1; White Globe No. 2, 1; White Globe No. 3, 1; Rose & Co. No. 1, 1; Rose & Co. No. 2, 2; Rose & Co. No. 3, 2; Rose & Co. No. 4, 1; Lunenburg, 1; Fraser's, 3; Elma, 1; Bowman, 2; Archer 1; Goldfield, 1; Newington, 1; Kemptville, 1; Millar's Corner, 1; Marlboro', 1; Silmser's Corners, 1; Spring Run, 3; Alfred, 1; Aultsville, 5; White Clover, 1; Leroy and Ogden No. 1, 1; Leroy and Ogden No. 2, 1; Glenroy, 3; Dalhousie Mills, 1; Beaulieu, 1; McCrimmon, 1; Glen Norman, 1; Cameron, 1; Bainsville, 1; North Augusta, 2; Maniuette, 1; Anderson's, 1; Oxford Mills, 1; Roebuck, 1; McKenna's, 1; Morrisburg Union, 1; Treadwell, 1; Plantagenet, 1; Morewood Union, 1; Bell's Corners, 1; St. Eugene, 1; Malakoff, 1; Eager's No. 13, 1; Pendleton, 1; Baltic Corners, 1; Vankleek Hill, 1; Iroquois, 1; Maple Grange, 1; Orchard Valley, 1; Algonquin, 2; Charleville, 1; Domville, 1; Centre Augusta, 1; Camerontown, 1; Willow, 1; Advance No. 1, 2; Advance No. 2, 1; Brinston's Corners, 1.

The total number of samples of milk tested was 3,850, among which I found 51 samples short of cream, and 32 samples adulterated with water, 83 cases in all.

In the thirty-two factories I found the milk all good.

Last year I reported 120 cases of adulteration and skimming in 52 factories, and only 11 factories where the milk was all good.

The plan adopted to punish parties sending milk not pure was to give them the option of paying into the factory a certain sum as damages, or going before a magistrate to answer the charge, and they invariably choose the former plan.

The damages were fixed at different amounts ranging from $5 to $50 according to circumstances. When it was convenient I usually had an interview with the parties, and failing that, I made it a matter of correspondence, or left it in the hands of the factoryman to deal with, always having a settlement made in writing or before witnesses.

Some of the parties admitted their guilt at once, while others would assure us that they could not account for the presence of water in their milk, and so on; but they were willing to settle without any trouble, and it happened somehow that the milk always came better in the future.

The cases were all settled in the manner mentioned above with the exception of a few, for there are still some managers who prefer to let these parties go unpunished rather than incur the risk of losing patronage or having any trouble. I am pleased to say, however, that they belong to a rapidly decreasing class, owing to the fact that inspection is becoming very popular with farmers of the right sort who see in it a means of protection against the thieving propensities of some of their neighbors.

The quality of the milk I tested shows a decided improvement over last year as far as purity goes, and in some factories the milk is better taken care of by the patrons than it formerly was. A large number of covered milk stands have been erected and aerators provided—all to good purpose.

I wrote to a great many patrons who were sending badly tainted milk, urging upon them the necessity for taking better care of it, and offering such suggestions as I thought most likely to help them.

A number of new factories were put up in my section last year, and I must say that they are better constructed than the average factory. Some of the old ones have been much improved also; but there are still far too many that as regard location, build and equipment are in no way fit for the purpose of making cheese in.

One of the chief troubles of cheese-making during the summer was a bad flavor which seemed very hard to get rid of. I was inclined to attribute the prevalence of this flavor partly to the peculiarities of the season. Much of the pasture being winter-killed, and very wet weather coming on early, an unusually large quantity of rank, weedy grasses sprang up, and being eaten by the cows imparted their rank flavors to the milk.

The bad flavor of many cheese, however, may be traced to causes in and around the factory itself. Fully one-half of the factories I visited were not provided with a proper supply of good clean water, and at least fifteen were using water positively unfit for any purpose whatever.

The drainage is so imperfect at some factories, that the waste water and whey run out on the ground and not being carried away soak into the ground, which may at first filter it somewhat before it reaches the well, but the time soon comes, when it is so saturated, that it no longer performs this function and the result is a compound in the well, which to use where good clean water is an absolute necessity cannot have any other than a deleterious effect.

It is hardly within the scope of a report like this, to deal with anything outside the bare facts that have come beneath my notice, but I enlarge a little on this matter because I realise its importance, and the growing necessity for remedying the evil. I repeat it is a growing necessity because it is evident from the causes aforesaid that where the evils exists at all it is constantly getting worse.

The condition of some of the vats in factories I have visited also tends to create bad flavors in the cheese. I speak of those vats where the tinning is worn off more or less, leaving the iron bare in places. When it gets bad these spots where the tin is off impart a very objectionable smell to the curd. It is after the whey is run off and the parts exposed to air that it will be noticed more particularly. I don't know the scientific explanation of this thing, but presume it is the same trouble which occurs when certain dishes of food are cooked in iron vessels.

I find also that the whey tanks are not always kept as clean as they should be, some of them not being properly cleaned and scalded once during the whole summer. Since the whey from these tanks has to be carried home in the milk cans it is very important that they should be kept clean, and were they kept so I venture to say that there would not be so much cause for complaint against the practice of hauling whey home in the cans, inasmuch as I believe this to be the real evil itself.

Twelve of the factories which I visited were models of cleanliness, seven were positively filthy and the balance were not any cleaner than they should be.

The ventilation of curing-rooms is not attended to as it should be. Many of the factories are not provided with facilities for so doing, and even where they are it is often neglected. I have urged upon all the importance of this matter.

In conclusion I wish to take this opportunity of thanking all factory men, makers and others whom I came in contact with in the performance of my duty, for their courtesy and friendliness whenever I met them.

J. A. Ruddick.

Lancaster, January 1st, 1891.

There was one matter I overlooked in my report. In my visits to to the factories I find that 50 per cent. of the thermometers are not correct. I find thermometers out 7° when tested as high as 98°. Cheesemakers find it hard to get reliable instruments. I hope that some of our enterprising dealers will do something to remedy this evil.

Gov. Hoard.—You speak of patrons watering milk. What percentage of fat have you established as being honest?

Ins. Ruddick.—I may say that we have not established any percentage of fat. We test the milk, and if we feel assured that it comes to the factory as it comes from the cow we have to let it pass.

Gov. Hoard.—Is this a really good state of affairs?

Ins. Ruddick.—It is not a good state of affairs, but under our present conditions we cannot do much better.

Gov. Hoard.—In Wisconsin we have established a minimum standard of fat—3 per cent—and say that no milk shall go below that, and it has helped us greatly in deciding what to do. If the milk is below that standard the owner has to stand the loss whether he skims it or the cow skims it. You also speak of a flavor in your cheese. You attribute it to bad feed. Have you examined the water drank by cows in certain herds?

Ins. Ruddick.—I believe that bad water has a good deal to do with it, and I have become convinced of that matter by a visit I made to the Eastern Townships some time ago where nearly all the water the cows drink is perfectly pure.

Mr. Ballantyne.—How do you positively ascertain the impurity of the milk so that you can establish charges against them?

Ins. Ruddick.—I may answer that by explaining as briefly as possible our method of testing. I use the lactometer and the cream gauge. Of course we get nothing but the volume of the cream, but by bringing the milk with the help of ice to a temperature of 40° I have been able to get at it very closely. I occasionally use the lactoscope. I compare the record of the factory milk with the milk drawn from the cows about the same time. We make both a farm test and a factory test.

A Member.—Can the milk that is left in the milk can or the whey tank be incorporated into the cheese?

Ins. Ruddick.—I do not think that cheese can be made without some of the cream going into the whey tank.

Mr. H. Bissell.—The cream that rises on the can is not the same as that seen in the whey tank. The acid forming in the whey has a tendency to meet the butter fat in the curd. If the cheese is properly made you will find very little cream in the tank. How do people make full cream cheese for a fair but by adding cream to a vat? So it will be seen that cream can be incorporated into cheese.

Mr. Ayer.—There are many farmers who have an idea that the cream on top of the cans can never get into the cheese, and therefore it is not a sin to take it off. (Laughter). If the gentlemen here to-day can be convinced that it goes into the cheese then their consciences will prick them and they will not offend again.

Mr. Ballantyne.—I was very much pleased with the Inspector's report. He appears to have done his duty fully. We were also troubled with those who were skimming milk. We had a better yield when we were taking the milk to the factory twice a day. The milk can be more satisfactorily taken to the factory by the farmer than by the factoryman. Where we had running water we generally had an agitator working which went from side to side and prevented the cream from rising. In a great many factories we made cheese twice a day, and we had good results. The Inspector's report has emphasised the importance of having experimental and educational stations for dairymen. It is utterly impossible that inspection can be efficiently done where the inspectors have to cover so much distance. Now if we had these dairy schools in charge of the best available men, running winter and summer, it would be a good thing, and thorough instruction can be given no other way. We have reached that stage where winter dairying must be made our chief aim. I was not always of this view. I at first thought it would interfere with our cheese business, but I have been converted in this matter. The demand for butter is increasing and will continue to increase. With all respect to our American friends our Canadian butter is better than the American, and has commanded a higher price in the British markets. We will have a home market for fine butter larger than we can meet for many a day. In the west we used to make provision for the winter's butter—we purchased ours in Morrisburg. But butter is not like wine, it will not improve with age. I had Babcock's separator brought to some of my factories, and showed all interested that we were able to ascertain the exact percentage of cream, and we have decided to pay patrons according to quality. On Monday three young men started for Madison to take lessons in the dairy school in operation this winter. And one of the best makers of Ingersoll recently said to me "I do not know a year when I would not like to go and spend a few days getting points from those who are interested in this great work of dairying." I am fully convinced that the next step we should take in developing the dairy interest would be to make cheese in the summer and butter in the winter, and thus keep our factories going all the year around. Speaking of the yield per cow, I had a heifer calf last January which gave me in twelve months 11,000 lb. of milk.

Mr. Keeley.—Should not the Association arrange soon to have the dairy schools start so that the cheesemakers might get some instruction before the next season?

Mr. Ballantyne.—Large bodies move slowly. I believe that if the instructors were under Prof. Robertson's control the work would be given a prestige that this Association could not give it.

INSPECTOR PUBLOW'S REPORT.

To the President and Directors of the Dairymen's Association of Eastern Ontario:

Gentlemen,—Having been appointed instructor and inspector by this Association for the season of 1890, I beg to submit to you the following report:

The district to which I was appointed comprises the territory lying between Kingston and Ottawa, west of the B. & O. Railway.

The number of factories in this territory are, as nearly as I can judge, about 150. Of this number over 100 made application for instructions and inspection. I had as many applications in before I began as would have fully occupied the time allotted to the whole work, as some of the applications called for from three to six visits each. This accounts for those who made application for instruction later on not receiving the same.

I commenced work on the 15th day of May and ended on the 10th of October. During this period I was 117 days in the employ of the Association, 94 days of which time I spent in giving instructions and testing milk in factories, the balance of the time being taken up in travelling, etc. The amount contributed by the factory men for the service of my inspection was $470.

The following are the names of factories which received instruction and the number of visits to each: Palace, 2; Oak Leaf, 2; Riverside, 4; Stanleyville Model, 1; North Shore, 4; Singleton, 2; Clear Lake, 3; Model, 3; Centreville, 3; Salem, 2; Lake View, 2; Maberly, 1; Brookside, 3, Watson's Corners, 3; Hopetown, 2; Middleville, 3; Rosedale, 2; Mississippi Pride, 1; Mississippi, 2; Farmersville, 1; Fairplay, 1; Balderson's Corners, 2; Harper's Corners, 2; Bathurst Mutual, 2; Lombardy, 2; Smith's Valley, 1; Reliable, 1; Frankville, 2; Plum Hollow, 2; Farmer's Choice, 1; Delta, 2; Philipsville, 2; Elgin Model, 1; Washburn, 1; Lyndhurst, 1; Morton, 1; Seeley's Bay, 1; Bay, 1; Escott, 2; Warburton, 1; Rapids Valley, 1; Anvern, 1; Roseville, 2; Myers, 1; Forfar, 1; Fermoy, 2; Ardmore, 2: Franktown, 1; Beckwith, 1; Hazledean, 1; Golden, 1; Pakenham, 1; Clear Spring, 1; Holland, 1; Westport, 2.

In said factories I tested 5,640 samples of milk and found 72 cases of adulteration and skimming; 71 of those cases were settled by the parties paying into the treasury of their own factory, fines of from $5 to $50 each In only one case had we to take legal proceedings, the party refusing to settle to our satisfaction. The fine and costs imposed in this case amounted to over $100. The amount realised by the patrons of these factories, from said fines, was $710.

One plan we took this year to try and raise the standard of milk and so to ensure the manufacture of finer cheese, was to post upon the walls of the factory a copy of the test, shewing the condition in which each patron's milk was found. This was objected to in some cases, but only by patrons whose milk was below the average quality of the factory, some of them maintaining that the instruments used were not reliable. To prove the correctness of the instruments, I sent samples (at different times and from different factories) to the Government analyst, at Ottawa, to be analysed, and in every case the test was sustained, the analyst showing that in some cases the percentage of adulteration was even greater than had been accredited to them, and in no case was there less.

The managers of many of the factories are to be congratulated on the improvements made to insure the manufacture of finer cheese, also on their endeavor to secure the very best makers, and their willingness to pay good wages.

I regret to say, however, that some factories are still in a deplorable state, although I have been notified that a number have been put in better condition for the operations of next season.

I think it is unnecessary for me to add anything more to this report. If any person desires information on any subject not taken up, I shall be pleased to answer any questions if it is in my power.

G. G. Publow.

Mr. Joshua Legge.—I have been very much pleased with the reports of the inspectors. I have been a good deal through the country, more especially that section where Mr. Publow has been inspecting the factories, and the reports I have heard while there were that these factories have greatly benefited by the instruction he has given. The chief complaint is that the territory is too large for the inspectors to fully cover. There is present here a delegation from the Kingston district to ask that additional inspectors be appointed for the section from Napanee to Kingston. With reference to the schools of instruction in dairying that Mr. Ballantyne has brought before the meeting, I would say that the matter was discussed a few years ago. At that time I took the trouble to get up a petition that such schools should be established in different places, but it was decided that one be established at the Ontario Agricultural Farm, and that the matter be left over for a future time. I have the honor to move the following motion:

"Moved by Mr. J. Legge, seconded by Mr. H. M. Johnson, that this Association request the Minister of Agriculture of Ontario to have established in this province schools for the purpose of educating butter and cheesemakers in experimental and general dairy work."

Mr. H. M. Johnson.—In seconding the resolution I feel as though I should say one word for the county of Prince Edward, for which, I am sorry to say, I appear alone to-day. For the past two years we have felt that we need the services of instructors more than we do inspectors.

The motion was carried unanimously.

[INSTRUCTOR BAILEY'S REPORT.]

In presenting his report Mr. Bailey prefaced it as follows: I was very glad to hear the remarks made by Mr. Ballantyne. I have wished for years that schools of instruction in dairying might be provided for the young men of this province, where they might receive the highest class of instruction in advanced dairying. I was pleased to see the unanimous way in which the motion referring to this matter was adopted. I have been interested in the dairy business for nearly thirty years. I travelled over considerable territory this year that I did not visit last year, and in some instances I found things in

a very bad state, involving a large amount of rather unpleasant work. I am glad to say, however, that I found a vast improvement in the territory I covered last year. The improvement was noticeable not only in the quality of the goods but also in the cleanliness of the factories. In cases where the factories were not up to the mark, I have tried to coax rather than drive. I have endeavored to show that a bad condition of affairs at the factory not only was detrimental to the welfare of those working there but also to the health of those who consumed the goods. No man likes to deal with a dirty baker who makes his bread in a filthy place, and it is just as necessary and important that cheesemakers should have clean quarters, utensils, etc., if they would have a good, saleable article and good customers. When you find in a factory a can the bottom of which has not been washed for a long period, what can you expect from the patrons? Mr. Bailey then complimented Gov. Hoard as an editor and speaker, and proceeded: Canadian cheesemakers should amalgamate and form a society, and in that way they could provide for getting paid for the work they do and doing the work thoroughly. In the *Mark Lane Express* recently it was said that the beautiful Canadian cheddars were among those awarded prizes in various parts of England. We do not want this pulling and hauling and struggling to bring down the prices paid to makers, or we cannot manufacture such cheese for the British markets. Makers should have meetings to talk over their immediate interests, just as well as any other class of the farming community who now meet. So far as taint is concerned, I have found that in nine cases out of ten the cows have been drinking impure water. I have also found thermometers very unreliable. My report is as follows:

Brockville, January 8th, 1891.

I beg leave to submit the following report for the season of 1890:

Number of days employed, 178, divided as follows: inspecting milk and instructing, 123½ days; driving in the different counties, 8½ days; travelling by railway, 5 days; Peterboro' Board of Trade, 2 days; Campbellford Board of Trade, 2 days; Belleville Board of Trade, 2½ days; attending committee meetings, etc., Belleville, 6 days, writing, attending court, etc. in connection with trials, etc., 28½ days.

Number of cases of adulteration found coming to the different factories visited: county of Hastings, skimming, 23; watering, 9; watering and skimming, 1: county of Northumberland, skimming, 28; watering 12; county of Peterboro', skimming, 49; watering, 11; skimming and watering, 1: county of Victoria, skimming, 12; watering, 8: county of Haliburton, skimming 3; watering, 4; watering and skimming, 1.

Number of cases fined, as far as heard from up to date 111; lost, 2; tried, but no judgments as yet, 5; admitted and not fined, 5; notified and no answer, 8; notified and no proceedings taken yet, 16; light cases, 15.

Amount of fines imposed, as far as heard from, $1,507.00, half of which goes to the factories and the balance to the Association.

I cannot give the exact amount paid in from all sources, as only a small part has been paid to me, as can be seen by the following account with the treasurer:

Paid to the treasurer by myself, fines from Haliburton county	$19 00
" " " " Northumberland county	53 50
" " " " Hastings county	22 50
Total amount received from the factories as paid to me and handed over to treasurer	245 89
Mr. Potter's annual subscription to Association	1 00
	$341 89

The balance of fines and factory subscriptions has been paid to Mr. Warrington or Mr. Daly, the treasurer.

Account against the Association for labour, etc:

178 day's work at $5 per day	$890 00
Railway fare, attending court, etc	26 60
Ether, alcohol, etc.	8 85
Telegraphing, postage, etc	3 74
Paid witness as per receipt	2 50
Costs in trial	10 20
	$941 89
Received from treasurer as per accounts to date, cash, etc.	$941 89

Number of cheese factories visited for inspection, etc., 265. Number of samples of milk tested for past season with lactometer and cream gauge, 5,215. Tested with the ether and spirit test, 534. Total tests made, 5,750.

Number of samples tested and found below 3 per cent. of butter fat, as shown by the ether test, 200.

A. E. Bailey,
Inspector, etc., Campbellford, Ont.

INSTRUCTOR ROLLINS' REPORT.

I now take much pleasure in submitting to you my second report as milk inspector and instructor for the western division of the Eastern Dairymen's Association. I visited 78 factories, leaving instructions and testing milk, and I am sorry to say that three-fourths of the factories are totally unfit to manufacture a first-class article of cheese, especially in the colder parts of the season. The making rooms are too open and lack the proper means of heating the room or keeping the curd at the proper temperature. I am pleased to report that factories built of late years are much better constructed than formerly, and some of the factory men are repairing their old factories so as to make them more comfortable. During the past season cheesemakers were troubled very much with gassy curd. This kind of curd is much harder to manage when it cannot be kept at a high temperature. There is not one factory in twenty where I visited this past season that has the proper means of heating the curd without injuring it. All factories should be supplied with racks to let down in the vats, or a curd sink properly constructed, with a steam or pipe attached, so as warm water can be kept under the curd, and if the water be kept at a proper temperature it will keep the curd at a proper and even temperature. I have seen cheese this summer ruined by working it too much on the hot vat, with dry steam running under. I find that a good many cheesemakers neglect ripening their milk, and the consequence is that it works too slowly. This same result happens when they drain the whey off before the proper amount of acid has been developed in the curd. I think it best not to stir a gassy curd while the whey is running off, and leave the curd rather moist until the acid is well developed. I have handled gassy curds very successfully by shoving the curd to each side of the vat when the whey is running off, and let it matt in that state for a few minutes, cut it and keep turning it until it is pretty well drained, then pile it deep in the end of the vat and turn it occasionally until there is quite a further development of acid. It should then be put through the mill and stirred and aired for a few minutes, and if too cold it should be warmed. It should next be piled and allowed to mat again, and put through the mill again when the acid is sufficiently well developed, which can be easily ascertained by the feeling and texture of the curd. It should then be salted and allowed to mellow down before being put to press. The cheesemakers and proprietors of the factories are not the only ones to blame for gassy curds. The primary requisite of good cheese is good milk. There cannot be too much importance attached to supplying milk to a factory in good condition. The indifference and sheer carelessness of some patrons is surprising, and until this state of things is improved it will be difficult to manufacture a fine article of cheese. During the past season, while going through the country, I found a very large proportion of milk kept in foul places some, in spite of all that has been said against it, so close to pig-stys that the whey is turned off the milk stand into the pig trough. In other instances milk stands were close to barn yards from which all sorts of objectionable odors were coming, such as manure heating, etc. Many do not pretend to strain their milk, and in examining cans of some factories I found some so dirty for the want of washing and scouring that it would be impossible to send milk in good condition in them. Another serious evil is that some cows are allowed to drink stagnant impure water. Some during winter keep cows crowded in ill ventilated stables, causing their systems in the spring to be fevered and their blood impure, and this, I think, has a great deal to do with the present state of the milk.

When factories were first started in Madoc township, where I first worked in a factory, I was four years in the business before I saw gassy curd, and then only occasionally. At that time few cows were ever stabled. I find, also, that where factories have just been running two or three years, in the north of the county, there are instances of some makers that have been at work two seasons and in that time had only one or two gassy curds.

I have dwelt at some length on this because of its great importance, and while on the subject of cheese making allow me to say that many of our cheese are too dry, lacking that fine buttery texture that all good cheese should have. I think this can be greatly remedied by not hand stirring so much and by leaving more moisture in the curd.

I am pleased to report that I find a marked improvement in the milk, so far as its being tampered with. I do not think I found this season one for every twenty-five I found two years ago, that, that in my judgment was tampered with more or less. I tested about three thousand samples and had only occasion to complain on eighteen.

There is another point I should like to refer to and that is the curing of cheese in the fall. I visited some factories last fall where there was cheese not more than one day or two out of the hoops and the temperature in the curing room as low as 34° Fahrenheit. Now, it is surprising that any cheese maker, after making a good cheese will allow it to spoil in the curing.

I have worked for the Association 115 days, as follows: 80 days testing milk, 37 days instructing, 14 days attending to correspondence, 14 days visiting factories, and traveling between same. Also paid out $5.33 for tin box, test tubes, postage, telegrams, etc.

ROBT. ROLLINS.

BROCKVILLE, January 7th, 1891.

Mr. ROLLINS added the following remarks: Let me refer briefly to the lack of cleanliness at some factories. The filthy condition of a few factories is really surprising. In some cases the construction of the floor makes it almost impossible to keep the premises sweet and clean. The owners should be compelled to improve matters in this respect. I said to one or two cheese makers, if I was a buyer the very first thing I would do when I reached the factory would be to step into the making room, and in your case I would go into the curing room prejudiced against the cheese. Some have good floors, but do not try to keep them clean. Some weighing cans and floors are scrubbed only once or twice a week.

TREASURER'S STATEMENT.

P. R. Daly, Treasurer, in account with the Eastern Ontario Dairymen's Association.

RECEIPTS.

Jan. 9	To balance from 1889	$269 36
" "	" Inspector's fund, 1889	21 30
" "	Members' fees, 1890	205 00
May 20	" Government Supplementary, 1889	500 00
July 15	" " Grant, 1890	2,000 00
" "	Inspector's fees from factories, Western Division	365 89
" "	Fines, Western Division	769 50
" "	Inspectors' fees from factories, Eastern Division	865 00
	Total receipts	$4,996 05

EXPENDITURES.

	By paid Expenses Convention at Belleville	$394 10
	" Balance due Inspectors, 1889	114 00
	" Burdette, law costs from 1888	130 00
	" Delegate to Central Farmers' Institute	10 00
May 20	" Expenses Executive Committee at Belleville	19 50
	" Delegates to Ottawa	37 00
" 29	" Board meeting at Belleville	51 50
Sept. 24	" " "	75 50
	" Grant, Cheese and Butter Exhibit	250 00
	" Judges for same	71 00
	" Secretary Ashley's salary	140 00
	" Inspector R. Rollins	730 38
	" " A. E. Bailey	941 89
	" " J. A. Ruddick	672 00
	" " G. G. Publow	702 00
	" Expenses Committee Eastern Division	41 00
	" Dempsey, expenses in connection with Inspectors	50 00
	" Rebate of fines to Factories	80 25
	" Treasurer's salary, $25; postage and stationery, $5	30 00
	To balance in Treasurer's hands	455 93
		$4,996 05

AUDITORS' REPORT.

We have examined your Treasurer's books and accounts as presented in the foregoing statement, and have found the same correct, and in accordance with vouchers produced.

We are pleased to notice an increase in receipts from factories to assist in defraying the expenses of inspectors, showing a disposition on the part of factorymen to assist the Association and the Government in securing the services of thoroughly skilled and competent instructors and inspectors, in order to hold our present *first place* as manufacturers of the finest average cheese in the markets of the world.

We would urge the importance of the Association and Government devoting all the money they possibly can for the building up and carrying on this grand industry.

Respectfully submitted,

M. K. EVERTT, } *Auditors.*
J. G. FOSTER, }

Brockville, January 7th, 1891.

Total Receipts	$4,996.05
Total Expenditure	4,540.12
Balance in Treasurer's hands	455.93

Mr. EVERTT.—I think there are some gentlemen here who would like to ask questions. One of them has said he understood that there were some $200 from the Kingston Board, but there is no mention of it.

Mr. DALY.—I believe that all that has been received has gone into the Report along with the factory inspectors.

Mr. JOHNSON.—The reason I wanted to know was that the inspector was doing good work in Prince Edward and was called away, and I understood that he was offered $200 for so going, and I did not see any account of the work.

The Treasurer's and Auditors' Reports were then adopted.

REPORT ON DAIRY UTENSILS.

The Report of the Committee on Dairy Utensils was as follows :

Your Committee find that there are several aerators on exhibition, and while we do not propose to recommend any particular kind, we wish to urge once again upon all dairymen to adopt them more generally. We also find a cheese vat faucet, exhibited by D. M. Macpherson of Lancaster, which is the best thing of the kind we have seen. This Committee would also recommend that the exhibition of dairy utensils be more encouraged in the future, and that better facilities be afforded to exhibitors for showing off the merits or demerits of their respective machines.

Upon motion of Mr. Daly, seconded by Mr. Derbyshire, the report was received and adopted.

DAIRY EXPERIMENTAL STATIONS.

Moved by Mayor Derbyshire, seconded by D. M. Macpherson, and resolved :

That whereas the ever growing magnitude of the cheese trade is creating new problems and difficulties in the production of milk and the manufacture of cheese and butter, which the dairymen in their private business endeavors find themselves unable to solve ; and whereas the Provincial Government in the past has given liberal assistance to associations and to the dairymen, for the purpose of assisting in the dissemination and the giving of assistance through inspectors to both the producers of milk and the manufacturers ; and whereas the Dominion Government has established the office of the Dairy Commissioner for the Dominion, charged with the duty of carrying on investigations with economical methods in the production of the finest quality of dairy goods, this Association in convention assembled heartily recommends to the farmers of the province the advisability of developing the practice of winter dairying, whereby they might add to the profits of cheese making in summer the enlarged profits from butter making in winter.

The Dairymen's Association of Eastern Ontario respectfully requests the Ontario Government to continue its financial assistance to this Association upon an increased scale, so that the work of the Association might be prosecuted with enlarged vigor and success.

Resolved further, that this Association urge upon the attention of the Dominion Government, the advantage and need for the extension of the work of Dairy Commissioner by the establishment of branch dairy experimental stations under the direct supervision of Prof. Robertson, for the purpose of carrying on such investigations into the principles and practices of cheese-making and the encouragement of improved butter making during the winter, by fitting up these stations for that purpose and by the making of trial shipments of fresh made butter in suitable packages to foreign countries, in order to establish a reputation there and to create a demand, at the highest prices, by demonstrating the excellence of its quality.

Resolved further, that copies of this resolution be forwarded to the Minister of Agriculture for the Dominion and the Minister of Agriculture for Ontario, for their favorable consideration.

CANADIAN CATTLE TRADE.

It was also moved by Henry Wade, seconded by M. K. Everett, and resolved :

That whereas the trade in the export of live cattle from the Dominion of Canada has been gradually extending during the past few years and has been a source of profitable income to our farmers and carrying companies, we, the Dairymen's Association of Eastern Ontario, hereby record our judgment that the robust health of the cattle of Canada, their freedom from all dangerous diseases and their general excellence of quality, is proverbial, and that the people of England need not fear that the health of their stock will be injured by the arrival of our cattle on their shores. We regret very much that the weather has of late been so inclement on the ocean that a great many of our cattle have perished. This, however, does not establish the presence of any disease in Canada, and we hope that Mr. Plimsoll will remain in Canada long enough to be convinced of this fact. It will be a very serious matter for the landing of live cattle to be stopped in England, as we cannot compete with the rancher in the North-west, where they can raise cheap corn in the feeding of cattle.

RESOLUTIONS OF SYMPATHY.

Resolutions of condolence with the families of the late Wm. Weld, of London, Ont., and James Millar, of Spencerville, were passed, as was also one of regret at the absence, through illness, of 1st Vice-president, F. H. McCrea.

CLOSING WORDS.

Mr. Derbyshire.—I have been delighted with this Convention. The speakers have handled their subjects ably, and the reports of the inspectors and instructors have been very satisfactory. I believe the instructors have gone more fully into their work than ever before, and a good influence is sure to result. I am looking for more vigorous work in the future as the result of this gathering.

After votes of thanks to the various speakers, the press and to the court house authorities for the use of the chamber, the Convention was adjourned.

COMPLIMENTARY BANQUET.

In the evening a complimentary banquet was tendered the visiting members of the Association in the Robinson House by the citizens of Brockville. The spread was an excellent one, and the toast list brought out many eloquent, practical and witty words from representative men. The Mayor of the city presided.

II.—DAIRYMEN'S ASSOCIATION OF WESTERN ONTARIO.

OFFICERS FOR 1891.

President - - - - - - - THOS. BALLANTYNE, Stratford.

1st Vice-President - - - - - - JOHN GEARY, London.

2nd Vice-President - - - - - - WILLIAM MESSER, Bluevale.

Directors.

Division No. 7.—ROBERT CLELAND, Listowel.

Division No. 8.—HAROLD EAGLE, Attercliffe.

Division No. 9.—E. CASSWELL, Ingersoll.

Division No. 10.—JOHN BALLANTYNE, Pine River.

Division No. 11.—ALEX. F. MCLAREN, Stratford.

Division No. 12.—WILLIAM SYMINGTON, Camlachie.

Division No. 13.—JOHN PRAIN, Harriston.

Secretary - - - - - - - - - C. E. CHADWICK, Ingersoll.

Treasurer - - - - - - - - - J. C. HEGLER, Ingersoll.

Auditors - - - - - - - - - JOHN S. PEARCE, London.
JOHN ROBERTSON, Gladstone.

Representative to Industrial Fair, Toronto - BENJAMIN HOPKINS, Brownsville.

Representatives to Western Fair, London - JAMES CARMICHAEL, Arva.
JOHN S. PEARCE, London.

LIST OF MEMBERS

FOR 1891.

Name.	Post Office.	Name.	Post Office.
Archibald, L. C	Antigonish, N. S.	Dunham, Peter	Innerkip.
Atkinson, M.	Melbourne.	Drummond, R. J.	Kilmarnock, Scotland.
Brown, M. R.	Appin.	Dobell, John	New Salop, England.
Blair, J. C.	Woodstock.	Dillon, T. J.	Ingersoll.
Ballantyne, Thos.	Stratford.	Edgar, Thos. S.	Brussels.
Ballantyne, R. M.	Stratford.	Elliott, James	Tilsonburg.
Brown, H.	Beaconsfield.	Eagle, Harold	Attercliffe.
Barr, G. H.	Culloden.	Fulton, John	Brownsville.
Bothwell, Wm.	Woodstock.	Fierheller, C. S.	Fordwich.
Butchart, J. M.	Burgessville.	Fero, Walter	Eden.
Brown, R. M.	Fordwich.	Farrington, J. L.	Norwich.
Brodie, John	Mapleton.	Farrington, G. G.	Norwich.
Ballantyne, T. J.	Listowel.	Gillard, Wm.	Stratford.
Bayne, Perry C.	Alberta, N.W.T.	Geary, John	London.
Burgess, Geo.	Bluevale.	Gray, Jas. A.	Atwood.
Bonser, Jas. H.	South Middleton.	Grieves, Jas. L.	Verschoyle.
Bean, W. H.	Eastwood.	Green, P. G. C.	Sheffield.
Bates, E.	Mount Elgin.	Holmes, D. E.	Embro.
Baxter, John	Beamsville.	Hopkins, Jas. E.	Brantford.
Caddey, Thomas	Ingersoll.	Hoover, A. H.	Springfield.
Cranston, R.	Lawrence.	Hopkins, Benjamin	Brownsville.
Cuddie, Robert	Woodstock.	Hodgson, H. A.	London.
Cleland, James	Listowel.	Henderson, W. G.	Marlett, Mich, U.S
Chown, Richard	Youngsville.	Harmer, Luverne	Bright.
Corless, John	New Durham.	Hainer, J. H.	Springvale.
Copeland, J. W.	Eastwood.	Haines, James	Mount Elgin.
Coneybeare Geo	Oxford Centre.	Isaacs, John R	London.
Dickinson eph	Springfield.	Johnston, E.	Arva.
Durand, Geo.	Belmont.	James, J. A.	Nilestown.
Duncan, Louis	Uttoxeter.	Johnston, Robert	Bright.

List of Members—*Continued.*

Name.	Post Office.	Name.	Post Office.
Jones, A. G	Glenallan.	Rusling, John	Boston.
Kidd, M.	Seville.	Riley, C. W	Ingersoll.
Kelley, Thos. E.	Otterville.	Robertson, John, jr.	Gladstone.
Keilor, Alonzo	Wallacetown.	Soper, C.	Guysboro'.
Leitch, J. A.	Lucknow.	Smith, E. P.	Tilsonburg.
Lane, J. F.	Crombie.	Snell, Robert	Norwich.
Lee, S. R.	Hickson.	Slawson, C. H.	Ingersoll.
Louden, W. C.	Putnam.	Sinclair, D.	Harriston.
Lockhart, M. T	Walmer.	Stewart, Chas,	Flesherton.
McCrimmon, S.	Otterville.	Schragg, C.	New Hamburg.
McCombs, Jas.	Kelvin.	Symington, Wm.	Camlachie.
McLean, Wm.	Crinan.	Scott, J. W.	Sparta.
McCallum, H.	Gladstone.	Stacey, James H.	St. Marys.
McBain, J. W.	Atwood.	Smith, C. W.	Centralia.
McLaren, Wm.	Avening.	Sherman, Alfred.	Bismarck.
McDermott, Jas.	Tiverton.	Saul, J. L.	Crumlin.
McGillivray, M	Listowel.	Travers, C. C.	Straffordville.
Marr, Enos.	Fork Roads.	Talbot, Charles	Crumlin.
Morrison, James	Henfryn.	Talbot, Leonard.	Crumlin.
Martin, R.	Cassel.	Taylor, John F.	West Lorne.
Miller, A.	Walmer.	Thompson, George.	Bright.
Matheson, Wm. A.	Northville, Mich. U.S	Thompson, Wm.	Arkona.
Noxon, James	Woodstock.	Wilson, H. E	Dorchester.
O'Mara, Thos.	Avon.	Whitelaw, R.	Woodstock.
Ostrander, W. A	Dutton.	Wilford, N.	Salford.
Ostrander, C. A.	Lyndoch.	Walden, James	Maple Grove.
Parker, A.	Rockford.	Wallington, Frank.	Tilsonburg.
Phelan, Daniel.	Woodstock.	White, H.	Pine River.
Patterson, James	New Durham.	Webster, William	St. Marys.
Patterson, J. G.	Wingham.	Wood, William	Molesworth.
Pickard, A.	St. Marys.	Wilkison, J. B.	Verschoyle.
Pearce, J. S.	London.	Williams, J. F.	Culloden.
Ritchie, J. T.	Otterville.	Wilford, John	Shakespeare.
Robertson, John	Gladstone.	Wooliver, W.	Avon.
Robertson, R.	Gladstone.	Young, Thos. E.	Strathroy.

FOURTEENTH ANNUAL CONVENTION

OF THE

DAIRYMEN'S ASSOCIATION OF WESTERN ONTARIO.

The Fourteenth Annual Convention of the Dairymen's Association of Western Ontario was opened at 2 p.m., January 21st, 1891, in the Town Hall, Woodstock. The convention was one of the most successful ever held by the Association, the accommodation afforded by the public hall in which the sessions were held being taxed to its utmost capacity after the first afternoon.

FIRST DAY.

Mr. C. E. Chadwick, the Secretary, said :

Gentlemen,—Up to this hour, from some cause or other—I cannot tell what—there is not a single officer of the Association beyond myself who has put in an appearance. But perhaps it would be well to utilise the time, as far as possible, and you might appoint a chairman, and call upon some gentlemen to address the audience upon the subjects to come before the convention. There are parties interested in the trade present who can say something that will be of interest.

Moved by Mr. Schragg, seconded by Mr. Fewster, that Mr. H. S. Lossee take the chair. Carried.

The Chairman.—It is rather an unusual thing that at this hour of the meeting not a solitary officer of the Association has made his appearance, but as you are here it is probably best to have something done in the way of discussion, and I will call on Mr. Robertson to address the meeting.

Mr. John Robertson.—It certainly is rather an awkward position that we have all been placed in, and you all know the difficulty there is in introducing the dairy subject and in bringing the proper points before the meeting to get a right start. I think you are nearly all cheesemakers here, and if you could give me a few hints of what you would like to have discussed when the meeting is small you might have more freedom and more liberty, and might gain a better interchange of ideas about your own work and what you have found to be difficult points to yourselves than you would have if once the meeting was larger and regular papers were being read.

Mr. Scott.—I will ask, in milking in a stable that is not properly ventilated—when there is impure air—when a pail of milk is set aside while other cows are being milked, whether the milk will become tainted while standing in the pail.

Mr. John Robertson.—It will just taint in proportion to the time it stands. It is throwing off steam all the time, but there are elements in the air which it will absorb. For instance, in the foul air of the stable there is a good deal of carbolic acid gas, which is heavier than the ordinary air and keeps falling towards the ground, and the consequence certainly is that a portion of it is bound to fall into the pail ; it may be so small that in a short time you cannot detect it, but it would be present, though in a less degree than if the milk stood for some time.

A TALK WITH CHEESEMAKERS.

Mr. James Butchart, Norwich, read the following paper: In view of the losses that some of us have had on account of bad flavor in cheese during the last two years, I thought I would have a talk with the cheesemakers, and see if we could come at the cause and find a remedy. These losses have not occurred with the poorest makers, but with some of the best and in the oldest factories, which have always been trying to elevate the standard of their cheese, and they are not the result of carelessness on the part of the maker, at least not in every case to my certain knowledge.

When cheesemakers have to make up in money for what cheese lack in flavor to the amount of from $200 to $1,000 during the season, it becomes a serious matter even with those of us who have not yet been thus dealt with. Just here let me say that I believe every cheesemaker, with the responsibility of the factory's make on his hands, is endeavoring to do all that can be done in his circumstances to make the best out of the material he has to work into cheese. So that there is not much danger of our cheesemakers spoiling good material. But the possibility of his making good cheese out of bad material is still less. It is just as impossible for a cheesemaker to make good, wholesome cheese out of bad milk as for a cook to bring a wholesome, delicious article of steak on to the table cut from a putrid carcase.

The cause of bad flavor in cheese in nearly every case begins in the milk before it comes to the factory. There is no article of farm produce so perishable and so critical to handle as milk. It is influenced by the food and water that the cows partake of; by the way in which cows are treated; by the weather and by the air; and this last I think is the most fruitful cause of mischief, but the least attended to.

I will quote from the late Professor L. B. Arnold, one whose memory we all respect, and than whom we have no better authority on milk, to show the influence air has on that article:

"Milk, it is well known, is an unstable compound. It is constantly undergoing changes, from the time it is formed in the lacteal glands until it is manufactured or consumed. When relieved from the action of absorbents within the udder, and brought into contact with the air, other agencies begin to act upon it, inducing the changes which afterward occur. Unstable as milk appears to be, it does not perish from anything in the nature of its own elements, but is destroyed by influences foreign to its necessary composition

If milk be drawn from the udder without being exposed to the air, and sealed up tight, it neither sours nor taints, provided it is healthy and sound when drawn, but if exposed to the air it soon sours and decays. Milk absorbs from the atmosphere the seeds of a fungus plant which grows and multiplies and fills it with their presence and produce the souring. There is nothing therefore in the necessary composition of milk which makes it sour or putrify. That it is always matter foreign to itself which destroys it must be evident from the fact that when all foreign agencies within it are killed by scalding, and those outside of it kept away by excluding the air from it, sweet milk will remain unchanged for time indefinite. Milk which has thus been kept sweet for a year or more will sour in two days at 60 degrees by simply letting common air come in contact with it.

The influence of air upon milk is not confined to the absorption of spores which produce acidity. Spores of every kind are taken in as well. Nor does the absorption power of milk end with absorbing living germs. It takes in every odor as freely as infectious germs.

It is a fact which cannot be too strongly impressed upon the minds of every one connected with the care of milk, or the manufacture of milk produce, that milk takes in every odor as well as the seeds of every ferment that blows over its surface. Every odor that comes in contact with milk is grasped and taken in at once, and its grasp is never slackened, once taken in it is there permanently. Milk must be handled and kept in clean and sweet vessels, and must stand in pure fresh air such as would be desirable and healthful for people to breathe."—*American Dairying, pages 167 to 173.*

Now what does all this tell the cheesemaker? It tells him that our system of airing milk is very disastrous in its results. Of late years dipping and airing milk as a means of preparing it for making cheese has been very strongly advocated. As the air is more or less cool than than the milk is when drawn from the udder, passing it through the air time and again was and is resorted to as a means of cooling it. But while this desirable end is accomplished in a small degree, we have lost sight of the fact that while airing it in this way we are inducing it to take in every bad odor and all the living germs with which the air of a cow stable or stable yard is loaded. Milk treated this way at night may appear to be all right in the morning, because of its being reduced to a point of temperature at which these agents of destruction do not work very rapidly. But as

soon as brought in contact with the heat they spring into activity, carry on their work of destruction, and can never be got rid of. Any one who knows the nature of milk, can see that milk aired in the atmosphere of a foul barnyard or on a milk stand, at the side of which there is a swill tub, and surrounded by a hog-yard, with all its filthy accompaniments, is not in a condition for making cheese.

Airing milk as a means of preparing it for making cheese has nothing to commend it. The object the patron has in airing his milk is to cool it. This it will not do when the weather is warm ; and the process is so slow and tedious that many give up before it is half accomplished. In my experience during the last twenty years, the best way to keep milk pure and sweet is to cool it with water or ice in a pure atmosphere to a temperature of 60 degrees or under, stirring it occasionally to let out the liberated germs. Milk when cooled is less susceptible to change or to take in spores, germs, or odors, and when at rest cannot take in so many. During the last season I was very much struck with the sweet wholesome character of a mess of the milk which sat all night in a spring of running water. It is well known that in the fall of the year, unless the weather has been dry and the water supply bad, we have no trouble with tainted milk or gassy curds. This we attribute to the weather being cool, and the milk in consequence is in better condition. Also at that time of the year there is very little dipping or airing of the milk going on. But enough has been said on the subject of airing milk, to cause us to investigate the question for ourselves.

There is another matter I would like to bring before you, briefly, and that is the subject of co-operation among us as cheesemakers. At present there is no understanding amongst us as to how we are to deal with the difficulties which from time to time present themselves at our various factories. or how we can best carry out matters of reform. If we had in every county an organization, and had certain rules and regulations whereby we could work in harmony with one another, and would meet in convention once or twice a year for the purpose of giving our experience in our work and talking over matters of reform, and annually send delegates to this convention, through which we might gather information from all parts of the Province it would result in some good. A thorough organization of this kind, it seems to me, would materially help the cheese industry.

The Chairman.—I consider this a very valuable paper, and one which this Asociation ought to dwell very largely upon. I am very sorry that there is not a larger attendance. I would almost suggest, when there is a fuller house, to have it read over again. We all know that no cheesemaker can make a good article out of bad milk. There ought to be some uniform way of taking care of this milk. There ought to be some sort of combination between the factories, and, as Mr. Butchart suggested, every factory ought to send delegates to these conventions, and through them they would make rules and regulations to much better advantage than ever has been done, and I would like to see that discussed fully.

Mr. Hugh Ross (Embro).—What effect has it on milk to draw it to the factory in the same cans as the whey is taken back in ?

Mr. Butchart.—The simple fact of drawing back whey in the milk cans does not have any effect at all ; but other matters come up ; there is the washing of the cans and taking care of them. Those that take back whey like to have things convenient, and generally you find they have a swill barrel right at the milk stand ; and the milk is aired on that stand, and these foul odors and germs are taken in which destroy the milk. I think that we have got into a very bad system of taking the whey back in the milk cans ; but we have got it now, and I suppose will have to make the best of it. You are all aware that in less than two weeks the whey will eat the tin off a can and then it is almost impossible to keep that can clean, and this must have an injurious effect on the cheese. Some are in the habit of sending back whey in the same cans as the milk comes in, and some fight against this. I think that the only remedy open for the cheesemakers now is legislation. We have legislation against sending skim milk to the factories, and against adulterating milk with water, and we might just as well have legislation against sending impure milk in the same cans as the whey is taken back in.

Mr JOHN ROBERTSON.—There is a clause in the Act that refers to milk that is either tainted or impure. Patrons can be hauled up for one as well as the other.

Mr. BUTCHART.—But they try to humbug you.

Mr. JOHN ROBERTSON.—Well, I think we have got a text from the gentleman who has read this paper. The first paragraph of his paper I entirely agree with; the second and third paragraphs I do not say I will never agree with, but it is contrary to what we have been taught by the most eminent professors and the most scientific investigators that have been educating us for the past two or three years. The paper says one thing; our teachers say another thing. There is a common saying comes in oftentimes in a dispute that the happy mean will lie somewhere between the two sides. Now, what Mr. Butchart said about airing milk is simply that it exposes a greater quantity of milk so that it will be more completely brought in contact with the germs and foulness that are in the air round about it. Well, I say yes, but I never heard anybody advocating airing milk in a dirty place, nor near air that was foul or impure. I am not at all, in any way, finding fault with the gentleman's paper, but I simply want to give you different views about the matter, and then you are the jury and I want you to talk the matter over. The first point there is room for disproving, if I got the thought right, is that there is nothing in milk itself that will lead it either to decay or sour. Now, our best teachers have taught us just the very reverse, and as far as my experience goes it has taught me the very reverse. Did you ever know of any animal product, take the whole animal kingdom, that has not the germs of decay within itself? Now, the first lesson that I got was this: I got, well I will call it a "tainted" egg for my breakfast one day and I sat and looked at that and I said, "How in all the world did that egg get that taint?" Because the film that lines the shell is both water-proof and air-proof, and it might have been laid in a dirty nest, but none of the foulness could have entered into the egg. Well, I just came to the conclusion that, like all other animal products, it had the elements of decay within itself. Suppose you put it in a silk handkerchief and keep it in the closest room in the house it will decay and all it requires is to be kept warm. 87 per cent. water, 4 per cent. fat, 8 up to 9 per cent. of other solids, with a very small proportion—something about 9 to 12 of 1 per cent. of mineral matter—that is the composition of an egg. Now, you all know if butter is not pure—if it has not the casein completely separated from butter—it will get rank with the flavor. Why is this? Not because it comes into contact with the air, but because the caseine—the chief ingredient of cheese nitrogen—has the elements of decay in itself, and that butter will decay, I don't care where you put it. Now another thing I know, for it affects this, is that milk will sour under certain conditions, supposing you put it anywhere you like, unless you boil it, and then you change its character. But take milk as it comes from the cow and put it anywhere you like, that milk is going to sour, unless you freeze it, and then you arrest all action of a chemical nature while it is frozen. What makes milk sour? When a boy I used to wonder when I saw grandmother churning, how she got nice, sweet butter out of sour cream. Now, the souring of milk is either quickened or retarded by the temperature the milk is standing in. You keep milk at 70° in the purest air under heaven and it will go sour in spite of everything. What makes it sour? It is just the very same element that makes it sour that makes cider sour; it is the sugar which is in the milk, which is nearly 4 per cent., and that sugar under the chemical action caused by the heat is gradually changed into acid. Now about the airing of milk; I thought until I heard this paper that we were making a little progress in knowing how to take care of milk and in knowing how to cure milk, but he rather staggered me, because he took us away back where we were ten years ago. Now, the way to treat milk is just simply this: What do you want it for? If I want milk to keep for two or three days so that I can use it then, I want that milk just as cool as I can get it, but if I want that milk to make cheese tomorrow morning I don't want it cool because I can take more cheese out of it and more profit all around. Is it not a fact in the fall of the year, when the milk stands outside while the air is frosty and cold, that when you get it to the factory you cannot get it at all cured and in proper condition and it has been after dinner time when you could get your vats set? Why was that? Just because your milk was kept far too cold during the night. It had not

been properly cured. If you want to make cheese don't keep your milk too cold. When I used to be making cheese every day I tried to have the milk so arranged in the dairy rooms that the temperature would never be below 62°. When the milk stands overnight it is just about right to mix with the nice fresh morning's milk, and just about ripe, ready to set inside of an hour, or sometimes it is ready to set by the time you get it in. Now, one word about the airing of the milk. I will give you just a word or two about my experience, but I do not mean to say I will give you all the reasons why this is so. Now, there would be no no need for airing milk at all if we got the milk always pure from the cow. I have sat on the stool and milked cows myself when I could feel the taint coming up out of the pail I was milking into. It was tainted in the cow's stomach. Now, that is the kind of tainting and injury that causes the gassy curds. It is in the milk from its very formation. Now the airing of milk is simply doing what you can to drive that out. That is the idea about airing the milk and exposing it over a thin sheet or surface in any way so that it will come in contact with the pure air, or the portion of the air that does it good, which is the oxygen which absorbs these taints and carries them off. I will tell you how you will see the principle exactly. You have been in sick rooms; the people inside would not feel it probably, but the air was so impure that it was almost unbearable, and if you will pull down a window and let a current of air go through the room it will not be long until it is purified. How does it do that? The window being opened starts a current of air through the room, and the oxygen being strong (and pretty well exhausted in the room) the fresh oxygen just gradually cleanses the air. I will tell you where you have seen it: in a church when it began to get warm and the lights grew dim and someone opened a window and the oxygen supplied what the burning lights wanted. Now the material is different, but the principle of airing milk to purify it is just the very same—exposing it to the oxygen of the air and it absorbs the taints and carries them off, and that is the best thing you can do. Now, it is not so very necessary if the milk is pure when it comes from the cow, but in our climate bad weather, hot weather and sometimes not the best of feed will account for this taint in the milk when it comes from the cow; and we should purify that which is impure and make the best article we possibly can. I have gone to farm houses that sent milk to the factory, and just as the gentleman who read the paper mentioned, the can was standing exactly beside the pig-sty and the milk came to the factory tainted and I wanted the farmer to shift his milk stand. One and another shifted their cans and that milk came next morning in perfectly good condition. You cheesemakers, I know, have been puzzled with all these things, and we want you to discuss this matter and tell what your experience is, and say whether you are not going to air the milk and go back where you were six or eight years ago, or whether you are going to go ahead and pick up all the crumbs you can.

Mr. BUTCHART.—I do not say I can set anything right, but I can give you common sense ideas for what I do and say. Now, I think I quoted to you very fully from Prof. Arnold on the subject of milk souring. The Professor has been one of our teachers for the last number of years, and we always sat and listened to him with a good deal of interest, and believed a good deal of what he said. It was he whom I quoted as saying there was nothing in milk itself which would destroy. Now, it has been tried time and again; milk taken from the cow and bottled up will keep almost any length of time, but exposed to the air it will be destroyed in a short time. An egg is not air-tight. If you could keep it perfectly air-tight it would not destroy. So it is with meat, and so it is with the fruit you jar up; seal it up air-tight and it will keep for years; take the cover off and it will soon destroy; showing there is an influence of destruction in the air. It is not the oxygen, and oxygen is but a twentieth part of the atmosphere. The spores that float around in the air are saved from the contact of oxygen by an envelope. If oxygen is going to kill those germs why does it not do so before it gets into the milk? Simply because they are protected from contact by this liquid envelope that surrounds them. You know in airing milk it takes away the animal odor, the taints that are supposed to be in the cow. It just depends upon the character of these a good deal. Why is the milk tainted as it comes from her? If she is healthy and has proper ventilation and good food the milk will not be impure. You know that breathing impure air will taint her milk. If you go into a room where there is turpentine it will not be long before your cloth-

ing will smell of turpentine. But tainted milk will not be tainted by anything that is purified. You may deodorize it, but the elements of taint are still there, and you cannot remove them by the process of airing at all. Now, in airing the milk you expose it to the air more. That is where I claim we are doing an injury, because in any air these germs of destruction will be found more or less, and the greatest trouble I had last summer was with milk that was aired. I said "Air it 10 or 15 or 20 times, we want to see if there is anything wrong in it," but it did not do any good. When it came on to the milk stand I could not detect anything wrong with it at all, but I happened to find out what mess of milk was doing the mischief, and I made it up alone. The milk came in in the morning nicely. I worked along and thought I must be mistaken just up to the time of dipping, but just as the change came on the taint began to develop itself. Now, we don't want milk cooled down too much, but I would rather you would all cool it down too much than send it in after standing in a temperature of 70° all night. In the paper I read—I advocated cooling down to 60° in the summer. I would rather have it even below that. We can regulate the working up in the factory, but I cannot do anything with this foul milk, and if it once comes from the cow foul you can deodorize it, but unless you make the cheese as hard as boards the taint will develop itself sometime in that cheese. If the milk is unhealthy when it comes from the cow it never should be sent to the cheese factory. People should be careful of that. But it does come to us, and we have to do the best we can with it. My advice to every man who wants to do right is when there is anything wrong with your milk keep it at home. If the cheesemaker says anything about it he is the best friend you have. He tells you because it is his honest conviction that the trouble should be remedied. I do say that I am emphatically opposed to airing milk. I was a little sceptical when the dipping was first commenced, because the milk never came in as good as from those that cooled it down a little, and I have been reading that we were just inducing it to take in these odors from the air.

Mr. Scott.—I have had some experience in airing milk. I sent last spring and got aerators for all my patrons, and all but four used them and they were small ones, and I believe we had the reputation of making better cheese than ever before. I thought myself they were far ahead of anything we had made, and I did not know what to attribute it to but airing all the milk—not in an impure air, of course. I know no other cause. I had the same maker as made for four years, and I must say the cheese was made better to my satisfaction than before. They were purer and sweeter in flavor than any of our former cheese. We went from one patron to another and tried to get them to put their milk through this aerator, and to impress upon them that our success depended upon the quality of the cheese, and that we must have the milk pure.

Mr. John Robertson.—I can quite sympathise with the gentleman who read the paper, and who gives a long quotation from Prof. Arnold's instructions, but if he (Prof. Arnold) had been here to-day his later reading would have led him to put a different construction on this matter than he did in his earlier teachings. He was a progressive man, and was always finding out something new. One night, when addressing us a few years ago, I think in this very hall, he told us that the little fat globules in milk were encased in sacs, and that the milk had to be churned a considerable time to burst these sacs so that we could get the butter. Now, that was believed at the time; but it has since been proven by scientific men, time and again, that the butter fats in the milk are not contained in any sacs, and that the proper system of churning is to get the cream to a proper temperature, and simply strike against it when the portions of butter fats will begin to adhere.

Mr. Scott.—It is not always the milk that is so much at fault. I must say the factory-men are at fault. We do not keep our factories clean enough. I believe, if every factory man would keep his factory clean it would be an example to his patrons, and then he could talk to them better.

The Chairman.—I will give you a little of my experience in cheese-making. I had one patron who has sent milk to me for twenty years, and he has always sent splendid milk. You can tell his milk blindfolded by the smell—it is so pure. His course of

taking care of it was to milk in the open air. Everything was pure and sweet all round the premises. Then his milk was cooled and aired. Well now, if one man can send pure milk for twenty years, I cannot see why the rest of them cannot. We get odors from pig-pens, and from this place and that place, and have a bad taint from a bad atmosphere and from bad water. Most farmers milk in the stables, and if you go into their stables you would not wonder that they send bad milk. The stables are filthy, and those cows are inhaling the most unhealthy atmosphere possible. I sold some aerators for Mr. Casswell, and I always told the men I sold, never to air except in a pure atmosphere, because they would do more harm than good.

MEMBERSHIP.

Mr. Casswell said the board had decided to do the same as at Listowel, and as had been done for the last two years—make no charge for admission. At the same time, you understand it is necessary according to Act of Parliament to have so many paid members in order to get the grant. We have tickets and badges for all those who want to become members, and the fee will be one dollar, which will entitle each member to receive a copy of the report.

DAIRYING IN WISCONSIN.

Hon. H. C. Adams, of Madison, Wisconsin, on being introduced was received with applause. He said: I supposed that it was to be an informal meeting this afternoon, and did not expect to say a word. I would like to do what Governor Hoard always says he likes to do: "Get the hang of the barn before he begins to tear around in it." (Laughter.) I am exceedingly glad to come to this province. I have wanted to come ever since I have seen Canadian horses, and Canadian sheep, and Canadian men, particularly Prof. Robertson. I have met no man in the United States engaged in the work of agricultural education who has impressed me, or the people of our state, more favorably than Prof. Roberston, of Canada. He came into the work of our Wisconsin institutes entirely unknown and unrecognised by any man except one, and that was Governor Hoard, and he took hold of that work with an enthusiasm, in a practical and theoretical business way, and with a clearness of statement which has made him thousands of admirers in the state from which I come. (Applause.) And so I am glad to come over here and to meet those who are engaged in the same line of business in which I am engaged.

The dairy interest is not bounded within state or national lines, and there is no one flag that covers it. We have to think pretty hard to make money in this business, and if you know any way to do it easier than I can I would like to find it out, and that is the reason I come over here. Then I want to find out how we can stem the competition of fraud that meets us, and I want to find out more about the handling of milk; so I don't come simply as an instructor, but I come over to meet you as a farmer in order to get instruction from you as to how we can get more out of the soil, which you can undoubtedly give me.

Over in Wisconsin we are supposed to be a great dairy state, and we are. We make 45,000,000 lb. of butter a year, and about 50,000,000 lb. of cheese, but we don't do all we ought to do, because out of that 45,000,000 lb. of butter at least 35 000,000—put it a little lower than that, 32,000,000—is second class butter, which sells at 14 cents per lb., and the balance sells at 22 to 25 cents per lb. Now, what is the reason of that? It is not because the men that make the 32,000,000 have not got the capacity to make a better kind of butter. They have got it. Can the man who makes poor butter not make a

better article? I tell you he can make a delicate, refined butter, and the trouble with that farmer is that he does not know what kind of a man he is himself—what kind of possibilities he has laid up in himself. It is necessary that we should make him use the information that he already has in order to secure confidence in himself. There is not one man in a hundred but has sense enough, if another man has got him, to take hold of a cow, study her and find out whether she does enough to pay expenses or not. There is no man hardly so common but that he can be taught that kind of a thing. The only thing with the Wisconsin farmer is that he loses $3,000,000 a year, not because taxes grind him, but just because he won't stop to think. He goes along blindly in the old way because it is easier to go along without thinking than to stop and think; and we have been working nineteen years to get these men to thinking and working on the lines of common sense and practical thought. We have accomplished something. Nearly twenty years ago we formed our dairy society. Before we organised the average was about 20 lb. per cow per year. The average product is now about 125 lb. per year, and that is not nearly enough. I have a great many times expressed a wish that lightning would strike 350,000 cows in Wisconsin before night, and the farmers would be better off. (Laughter). But we have had additions to farmers' associations, and good has been accomplished through scattering of thousands of reports. We have what we call "institutes." We go right down to where the farmers live—close to their homes—and have a dairy session and talk about milk and butter and cheese making cows, and men wake up where they have been sleeping all their lives. At first, out of a thousand, 900 of those who went to an agricultural meeting did so to ridicule or to look on with mild interest, but after the first session or two they began to think about these things; and I have seen men come who never made a speech in their lives, who would get so hot that they would be on their feet in less than two hours, and the rest of the meeting you could hardly keep them in their seats. (Laughter.) I remember a story of a man in a State across the boundary. This man's friends wished to induce him to be a candidate for Congress; he said he did not want to act; but they insisted upon it, that the party that he belonged to required his services, and he finally consented. He was elected and re-elected, and when he came up the third time one of his friends who brought him out the first time was a candidate against him, but he failed and this man beat him. The defeated candidate said: "Why, this man makes me think of a calf; you have to pull his head off to get him to suck, and you have to pull his tail off to get him away." (Laughter.) And so these meetings have been educational, and have drawn out the good that lies latent in the farmers, and storekeepers have said to me it is astonishing the change that has taken place in the butter made in the last two years in that state. The farmers are brightening up. I want to say, as I said to a gentleman this morning, that a man who goes through an agricultural college has a hard time of it with those hard-headed farmers. At the same time I do not wish to cast any reflection upon those men in agricultural colleges. They are doing grand, good work—a splendid work. I wish you could see the work of Prof. Henry in the experimental stations. He has made experiments with feeding hogs on milk, and with various kinds of machinery for the extraction of butter-fat, and with cream; and we have established the first dairy school in the United States in connection with that sort of work. We have not been able to make an agricultural course a success, but just as soon as the interest is so extensive in the State as to justify us in doing so, we have pledged ourselves to establish it. There were three young men over there from Canada at our dairy school. Now then, in that dairy school we have something we have wanted for a long time, that is a place where we can send boys, young men, old boys; where we can teach them to make butter according to a definite practice, and teach them how to make cheese. And preliminary to that work we send a man over to Canada to find out what he ought to instruct them in. I have been until the past year, an officer of the Wisconsin State Association for a number of years, and every little while I have got letters asking who were honest and made good cheese, and it is mighty hard to find them. You can get men who are honest, but most of them don't make good cheese—(laughter)—and occasionally you get one who is not so honest as he ought to be. So we are doing that in the line of dairy education.

A number of years ago it was my fortune to be a member of our State legislature, and I had just one ambition, and that was to establish an agricultural school in my State similar to the one you have here. I think the time will come when we will get it. I was beaten then; political influences came in. I received the support of nine out of fourteen lawyers of the House and the majority of the farmers were against me. It is a singular thing that the profession of farmers, to which I belong, look with more or less suspicion upon all public movements in their interest. That ought not to be so. I want to say to this convention, as I would say to a convention in my own State, that if the farming class obtains that standing in political life, in international matters, which it ought to have, it must simply be because it deserves it. It must not build itself up by tearing down other existing professions, by decrying or pretending more honesty than other professions; but by making itself more intelligent, cleaning out its own doors, becoming educated men, not simply in the schools, but educated where you live by all the influences about you, by your neighbors, by other classes, by agricultural papers, by agricultural colleges—by all the influences which in this country and my country surround every intelligent man. (Applause.)

MR. BUTCHART'S PAPER AGAIN.

The discussion of Mr. Butchart's paper was then resumed.

Mr. J. S. Pearce.—I have had more or less intercourse with cheese-makers—practical men—through the country, and the prevailing opinion is that airing is the proper way to get the odors out. I may state just one instance in my own experience when I was a cheesemaker myself, eighteen years ago. I then had a patron about three or four miles from the factory, who brought his own milk in every morning. During the five years that he supplied the factory his milk came in in perfect order. Now, what was the reason for that? That milk was strained into shallow pans, and set away in the milk house (first stirred) on a cold floor. I think this is a pretty good argument in favor of cooling and airing milk.

Mr. Butchart.—I would like to get the voice of the cheesemakers on the subject of co-operation, in the way of organizing county associations. Sometimes when the "big guns" come among us at a convention like this one we do not say so much as we might do at a country convention. We have difficulties in our business. For instance, I have a man who will not attend to his milk as he ought to; maybe he skims a little or waters a little; now, I want to train that man up a little, not that I care for the man himself particularly, but for the sake of the honest men who are suffering. The fear that he will take it somewhere else keeps you from saying anything about his milk. Well, now, if we arrange it amongst ourselves that if a man was a delinquent at one factory, another would have nothing to do with him, we might stop this sort of thing. Then there are a great many other things; some men will persist in setting milk by hog pens, and if you don't want it some one else will always take it in. What I want is, to get the cheesemakers together to work in harmony with one another to straighten up these things. We might meet and pass rules and regulations; but unless we have some way of enforcing them, there are some who will resist all the good that has been done.

A Voice.—I tell my patrons at the beginning of the season that if they send their milk the season throught I will consent to charge so much. I make a charge in proportion to the season. If they send for six months I charge so much, and if for three months so much more. I make this proviso also, that I need not take a man's milk if he sends bad milk. They all agree to this.

Mr. Robertson.—I have advocated strongly the last couple of years that if a patron after being instructed as to how to take care of his milk, will not take the advice in a sensible, quiet way, to simply tell him he has to keep the milk at home. Do not be

afraid of another factory. I see by *Hoard's Dairymen*, where they caught two or three of these stubborn "chiels," they simply told them they could not take their milk. I had one case of this myself last season. The man was very "honest." "Now," he said, "you are not going to get a sample of my milk." I said: "It is your property and you can do just as you please." He said, "Well, if the company is not pleased to take the milk as I send it I will just keep it at home." There was a meeting of the factory board and they asked, "What will we do?" I said, "Take him at his word." So the milk wagon would not haul it, and he left it at the factory himself. The milk hauler took it home again; and he went to another factory next day to see if they would take his milk. The cheesemaker said "No, if you cannot agree with the men you have been dealing with we cannot take your milk." I believe he would have given $50 if the factory had taken it. He had no pans ready, and actually for four or five days he was obliged to feed the milk to the hogs. Then he came to the factory again to see if they would not take his milk, but the directors said "No, we thought you were a man of your word," and I believe it was the very best lesson the neighbourhood ever had.

Mr. Scott.—I believe it was a very good stand to take. But many times we find other factories will take the milk. They make bad cheese, perhaps not so good as a factory which refuses such milk—and yet it goes on the market and has its place. I believe the rule would be a very good one not to receive milk at one factory when it was rejected at another on the ground of bad management or adulteration.

Mr. Casswell.—I would recommend the cheesemakers if they think well of this matter of county organizations that they prepare a resolution recommending such a thing and then it will be in business like shape; and I would also ask Mr. Butchart whether he intended to have these meetings for cheesemakers only, or whether they would ask the patrons in the neighborhood of those meetings to attend and give them some points on the keeping of milk? By doing this, I think you would arrive at two good points.

Mr. Butchart.—My idea was that this organisation should ask delegates to be sent to the county convention from the milk meetings, the representation to be, say, two from the patrons and one from the factory, and then send delegates from the county conventions to this convention, and in that way I think we could reach the patrons better than at the present time.

Mr. Casswell.—You are aware that one trouble has been to reach the patrons The cheesemakers attend the meetings, but the patron has not received the instruction he ought to receive. But far more could be done to educate them if you would hold county meetings and township meetings through the winter. If you would call out your patrons and tell them what they want, I believe there would be more good done and an end would be reached which has not been served by this convention.

Mr. Pearce.—I think the time has come when you should organise yourselves in the line of Mr. Butchart's suggestions. One more subject for consideration would be a regulation as to routes, etc. You all know that the big expense in the making of cheese is the drawing of milk and that it is nothing unusual to see two or three waggons going over the same route; and I think the day has come when that should be done away with. It is money thrown away that does nobody any good. I would also speak of another point, and that is that cheesemakers are "beating" each other down to too low wages. Now, if you had an association of this kind you could fight against that unjust and unnecessary system. I, as a dairy supplier, say that you will have to lay down cast iron rules. I would suggest that a committee be appointed to draft some resolutions on these subjects. The day has come when you should act, and the sooner you take this thing up the better it will be for you all. (Applause).

Mr. P. H. Green, (Sheffield).—Some twenty years ago three other gentlemen in our neighborhood and myself established a factory. We ran it for a length of time, but, having other business, unfortunately I dropped out. I have lately taken charge of the business again, and I am here for information. During my short experience there we met with just the difficulties discussed this afternoon. I remember getting hold of one patron whose milk was very poor indeed. Our cheesemaker had very little experience, and we

had none, and as a result some sent good milk every time and some sent poor milk, and we had some difficulty in this way. I took the charge of arranging with the patrons in my own hands and when we found any person's milk not quite satisfactory, we quietly drove down to see it, and asked the man to come to the factory and see the milk he sent, compared with what he took from the cows. I never yet got a man to go with us. They were all quite willing to submit. This man said whatever we decided he would stand by. I wrote back that his milk fell short three-eighths of the standard. We gave him his choice of taking a reduction or going before a magistrate. He accepted the latter, and his milk fell short thirty to forty pounds. He said he had dried off two cows; I said he had dried off the best ones. We had some difficulty with the tainted milk. We tried every plan we could imagine to get over that difficulty. We knew we were turning out an article that was very unsatisfactory. The milk appeared to be all right when it came; it was put into the vats, and when the souring process was going on, we noticed a musty smell. The cheese was soft and had the same smell. We examined the milk and found it all right. We examined the cans and found they had that musty smell. The lids were worn and patched, and in these lids there were little openings large enough for the milk to get in and ferment, and that just spoiled the milk. As soon as these lids were "kicked" out of the factory we were done with the difficulty. I think Mr. Casswell remembers the difficulty we had. If I mistake not he handled some of the cheese we made at that time. We have one patron who aired and cooled his milk. It was stirred for a length of time and dipped. It was set in shallow pans and set in water. I have had, in the hottest weather, from six to seven cans of this milk kept over from Saturday night to Monday morning, and it came in as sweet as a nut. While I have the floor, I should like to ask another thing, and that is whether there has been a factory inspector appointed for this Association, or whether there have been any steps taken to have an inspector with reference to the management or testing of milk?

Mr. Benjamin Hopkins, Brownsville, the 1st vice-president, entered the convention at this stage, and was called to the chair.

Mr. Casswell.—I would just suggest, if it is agreeable to the vice-president's mind that I think it would be well to continue this first session in an informal way mainly for a discussion between the cheesemakers and the people on the floor, and I think more good can be done than by a good number of long papers. You have done a lot of good this afternoon; and with regard to the motion that I suggested it would be well to leave that until to-morrow.

THE PRESIDENT.

The Vice-President.—I am pleased to be here and to meet you to-day. Our esteemed friend, Mr. J. B. Lane, the president, about a year ago went home sick from our Convention at Stratford and since then he has been out but very little. I was in hopes he would be able to be with us to-day, but I hardly think now he will be here. However, we will do the best we can in his absence. There have been no inspectors for the past year and there has been no action taken in that matter so far as the present year is concerned. I suppose the new Board of Directors may recommend it. The year before we rather overstepped the bounds and went considerably in debt, but I suppose we will be able to declare a clean sheet so far as the finances are concerned at this time, and therefore may be in a position to do something in that direction.

Mr. Chadwick, the secretary, was called upon to read a letter from the President, which expressed his sincere regrets at being unable, in consequence of prolonged sickness, to attend the convention, and stating that though he despaired of ever being able to take part in the work of the Association again, his heart would be with them to the end in the good cause of developing and improving the dairy interest.

COMMITTEES.

The Vice-President named the Business Committee as follows :—

Business Committee.—J. S. Pearce, London; J. W. Scott, Sparta; Jas. Williams, Culloden; Wm. Fewster, Norwich; Thomas Ballantyne, M.P.P., Stratford; H. S. Lossee, E. Casswell, Ingersoll.

The following committees were elected :—

Committee on Resolutions.—J. M. Butchart, Burgessville; J. L. Farrington, Norwich; Ezra Bates, Mount Elgin.

Committee on Utensils.—E. Hunter, Woodstock; John Fulton, Brownsville; C. Schragg, New Hamburg.

PROF. ROBERTSON ON GENERALITIES.

Prof. Robertson was called upon to give "a general talk." He said: I am quite unused to being called upon to talk in a general way on some general and indefinite subject. I have made it one of my aims always to keep quiet when I had nothing but generalities to speak upon; so this afternoon I am beginning my mission on generalities in dairying.

The first general statement I want to make this afternoon is this, that when a man wants to make a speech, or run a cheese factory, without some definite object in view, he is almost sure to come to grief at some part of his experience. I find men all over Ontario going into cheese making on general principles, and they take milk of all qualities on general principles, to keep in with the people of the neighborhood. Then, I find them doing the work in the most particularly general way, without any particular attention to any particular process, and then we have cheese so comprehensive in every aspect of its nature, as to the shape and as to the size and as to the quality, that you could not possibly name any kind of cheese that would not be embraced in that lot. Now, these generalities do not suit me, so I would like cheesemakers always to have some specific object in view, whether they come to a convention or run a cheese factory; and if a cheesemaker comes here who should now, even at this late hour, make up his mind as to some particular point that he wants to know something about; or if he wants to give information to other cheesemakers about anything he has found out—if he has come with the intention of obtaining any information and of disseminating information—information will be brought to everyone who takes part.

Then I find that we are happy in having with us so many men who have done good service in the past to the dairy interests of this province. Since we have men who have an accurate acquaintance with all your needs I need not take long. My friend, Mr. Ballantyne, is here, and all want to have some of his bright thought, enthusiast as he is. Then we have our friend, the Honorable Mr. Adams, of the state of Wisconsin, the one state in the American Union which is pushing us hardest for the best place as a dairy country on this continent. Now, the Wisconsin people have the very kindliest regard for the people of Ontario, and I believe away down where I keep private opinions, that although they come here it is merely in the excess of their generosity and that they believe we will keep ahead anyway, but they like to stimulate us. So friend Adams, while telling us what they are trying to do in Wisconsin will tell us this one thing at anyrate which the people of Wisconsin have demonstrated to the people of the world, that it is possible to keep cows paying for their board for twelve months in the year, and that may help to lift from us the terrible reproach we lie under to-day of keeping herds of cattle paying seven months' board and living on us the other five months, just because we are fond of doing drudgery and of reproaching the Government instead of minding our own business.

Now, let me say a few things more about this dairy business as to its meaning here in Ontario. First of all we have been doing excellent work in making lots of fine cheese during the summer months, but we ought to do more than that with our herds of cattle. I would like to see the dairying season lengthened at both ends, but I cannot recommend the cheese factory men to make cheese earlier than April as a rule, because the roads are bad and fodder feed does not make the best of milk for cheese making. I cannot recommend cheese factories to lengthen the producing season at the other end, because when the roads get bad the expense of drawing is greater, and the cheese factory buildings are ill adapted for making good cheese in winter. What should we do at both ends to lengthen the incomes from buildings and business? First of all you will find these to be the existing demands; that there is a demand for fresh made butter, and that while stale dairy butter will bring 15 cents a lb. fresh made creamery butter will bring 24 cents. Roads will seldom be bad enough to hinder a man from sending all his cream to one centre, because the creamery wagon can go round twice a week in cold weather, collecting about one-sixth the weight that he would of milk for a factory and the farmer will realise from that, during the winter, nearly as much money as from the cheese factory in summer. In that way I think we ought to lengthen both ends Then, to do that, would involve slight changes. We need to have a few men who will begin having their cows milk the year round—not the same cow milking the year round, though each cow should work the year round. She should make milk ten months and then spend the balance of the year in making a calf. She should not be milked these two months, just because she has maternal functions requiring all her energy. Then we require some cheesemakers who are long-sighted enough and clear-headed enough to know that they can never get $10 a month more until the farmers make larger profits. Then they will urge upon their patrons the advantage and necessity of starting their cows to milk in the fall and all winter, and then from the enlarged profits they will get their own share. We need also to have a few common-sense factory owners who will advocate the desirability and practicability of changing the cheese factories into butter factories during the winter months.

The total cost of changing a well built factory need not exceed $250. Now, the sooner that is commenced the better for the dairy business. The whole change can hardly be made within ten years, but a few factories leading in this good work will soon induce most of the factories to follow their example.

In that way I think this convention could not do better than discuss details of any change in the basis of carrying the business on under that plan. I say that for this reason, that in the mass of general work our conventions now-a-days should be devoting their time far more to discussing the broad principles that we ought to follow and to apply in this business than in discussing the details in making cheese in factories; but in making this new departure we ought to follow even the minute details, so that plans formed and practices established may be undertaken at the beginning on correct principles. And then, to compensate for the leaving out of our dairymen's conventions, of so much discussion on the practical part of handling milk and manufacturing cheese, I would throw out this suggestion—which is not new, but I give it the endorsement of my approval—that the cheesemakers ought to have a cheesemakers' union, where they ought to have things settled which cannot be settled in a mixed meeting of cheesemakers and farmers and salesmen. Cheesemakers have several objects for such an organization. For myself I have very little sympathy with any combination that means coercion, but you can have combination without coercion; a united action, or combination, for expending energy with better results. Now, if cheesemakers had co-operation they would fix a scale like this for remuneration: they would say that a factory, where they make so many tons a year, shall not be taken by any cheesemaker at less than so much per hundred lbs., and then let the person or persons controlling that factory select a man according to the ability, capacity and competence for this work. Now, it is not often a question as to the man who can make the finest goods, but the owners strive to get a man who will cut his wages down, and if this is continued good men will become disgusted with the business and then our trade will go to pieces. Such a union would be useful. Perhaps its greatest usefulness would arise from this particular, that cheesemakers could there discuss the

very best ways of testing milk, the very best ways of discerning the proper ripeness of milk for cheese making, and all that part of the business which belongs to a cheesemaker's trade and has no special interest for the people who come to our conventions, they being farmers. Then they could discuss that aspect that has been altogether neglected, that is the equipment of cheesemakers by a more thorough understanding of their business, not merely as a trade, but as leading up to something better, where the cheesemaker would understand the whole theory of cheesee making, and where he would lead in his neighborhood and be not merely a labourer, working for a few dollars more a month than agricultural laborers. I know of nothing after all that would elevate them more as tradesmen than having a sound, well-conducted cheesemaker's union to enable them to solve some of these points.

Speaking of the patrons, Prof. Robertson said: One man sends milk to the factory and complains that the bottom has fallen out of the dairy business, because the cows last year gave him back $22 each, and then he begins to wonder why it is that the cheese-buyers always get the better of the poor farmer, and how it is that the cheesemaker can dress well on Sunday, while he has to wear the same coat for four years; and he goes on wondering how it is that the Government can pay such nice salaries, and he is all the while "nosing" after those far-off factors whence no help will ever come. First of all he forgets this, that the man who keeps 12 cows and never finds out which is paying and which is not, is tempting the devil—and he does not require much temptation to do wrong as a rule—to keep 12 poor cows living on him all the while. If a man will control that factor as a rule he will find the 12 cows that are paying and turn the others out. By having his eyes all the time intently fixed on something he can control, he will find the cows that milk for a long period.

Then he will have to control the factor of feeding a far less expensive feed. How will he do that? The man who does not grow anything but grass has no right to scorn Providence for putting him in a bad climate, because our country will grow bigger fodder crops than any in the world. Now timothy is a good grass, but it is not half so good as corn grass. Corn grows, you see, to a height of seven feet against timothy's two and a half feet, and it does not exhaust the land nearly so much. On general principles, you see, a man should look after his own business at the home end and he will find his prosperity established

Then a man should control this other factor; he can make his cows give nearly one-third more milk during the summber by having them stabled and fed all winter. I have been out the last four days since I was at Berlin, and I have seen farmers feeding cows on dry hay—so exceedingly dry that I question if the chemist would find much moisture there—and dry straw (and no roots) and a little dry grain; and the cows are all dried up, not only in their milk but in their hair, and then all the avenues for the milk are dried up and the cows cannot work next summer; and so if the farmer would feed some succulent foods, some corn and roots, they would make far more milk and larger profits.

Then, more than that, I find farmers keeping only six cows on 100 acres of land, whereas they ought to keep four times that number. An acre of corn will feed just four cows all winter, but an acre of timothy would not feed one cow all winter, so they have to go into this factor, which is altogether within their own power to regulate as they choose and to apply as they like. They might keep four times as many cows, and then that would mean what?—four times as much manure, and four times as much manure would mean bigger crops. And so by picking out the best cows, and feeding succulent food all summer and succulent food for the cows all winter, the farmer will get more milk and more money, and more manure and better crops. So he can keep more cattle until he will find it is a paying business to run his farm to the full capacity instead of only utilizing one-fifth of the land he owns. It does not pay a man to have a very large factory with a hundred people in his employ working at only one-fifth the capacity of the building and the people; he cannot make profits that way. His profits come from doing all that his machinery and people are capable of turning out; and so a hundred acre farm in Ontario ought to maintain 25 cows, and all young cattle ought to be complementary to that.

And so on general principles—and this is the end of this general talk. I would tell you this, the more cows you can pack on 100 acres of land, and the more corn you grow, and the more manure you get, and the more milk, the more money you will make as individuals and the more money you will have as townships and counties, and the more prosperity we will have as a province. So, on general principles, since population anywhere increases the value of property—the larger population of people you get, the more business you will have, and the larger population of good cows you get, the larger the profits you will make.

This is incidental, but sometime during the progress of the convention, I will try to give you either more specific advice or information as to how I think you will be able to carry this winter dairying on in the years to come. Meantime, I am not "giving anything away" when I tell you that in some experimental factories in different centres we hope to try and demonstrate the application of the very principles or practices that I have this afternoon been hinting at for your guidance, and when we have these centres established, and the practicability of these hints has been demonstrated, then I would hope that the whole province would by-and-bye be covered by cheese factories and creameries doing business for twelve months in the year. If we start these this winter, in three years' time we will have ten for one now, and later there can be 100 factories running all winter. I hope to come to Woodstock then and see it. (Applause.)

THE FOREGOING ENDORSED.

Mr. Thomas Ballantyne, M.P.P., followed with an endorsation of Prof. Robertson's suggestions. He said: It has been my experience and preference to do what I could in the way of improving the cheese product and also to assist in developing what Prof. Robertson has hinted at, viz.: combining butter with chesse. The more I think over it the more I am satisfied that successful dairying can only be profitably adoped by educating the cow. For a time I did not see my way to introduce butter in connection with cheese. We had established a very succestful business in cheese. We had been the most successful country on the continent of America. The state of Wisconsin had made a reputation by copying our methods and the state of New York, to some extent, as well as the Old Country, and so far there seemed to be some reason to fear there was a risk in combining butter with cheese dairying. But I am fully satisfied that in order to obtain the best results a percentage of the cows will have to calve in the fall. There are many reasons for this. It is the season when farmers have most time to attend to it; it will result in better feeding and in a better quality of article; it will enable us to make butter when there is a good price for it.

Then there has always been another difficulty in connection with cheese making and I have felt that from the first day I commenced. We have now a great many farmers' institutes doing a noble work in educating and making farmers think, and really the assistance the Government has given to stimulate these has been productive of much good. When cheese factories were first started the question with the farmers was how factories were managed and what they could expect from their cows. The first difficulty suggested was what are we going to do to raise our calves and feed hogs? Winter butter making will largely help this. The farmers have not been raising the character of the cows. It has been a hap-hazard system and they had either to lose the milk or starve the calf, and as a rule they chose the latter. Winter dairying will enable them to select better stock. They can feed their calves in the winter and turn them out in the spring. I was going to say that we have led in dairying; I hope we will continue to lead. My friend, Prof. Robertson, talked about general purpose principles or remarks. Well, he does not generally talk "general purpose," and he did not to-day. I have not much faith in general purpose anything; neither has he. I believe in something definite that we can practice and adopt, and we have been doing so in cheese making, but we must not stop here. We must look forward and see how we can be better educated.

Now, I would say this, that our American neighbors in some respects are very much ahead of us. They are doing work in Wisconsin, from which friend Adams comes, that we are not doing ; we have been doing work that they have not done. We have been more successful ; and I am glad that whatever politicians may do to raise barriers against the interchange of trade there has been the utmost reciprocity of sentiment between the dairymen of the United States and those of Canada, and on behalf of the President of the Western Ontario Dairymen's Association I am glad to welcome Mr. Adams to our midst. When we started we were indebted to our American friends for their assistance. At our first convention we were almost exclusively indebted to them for the information we got. The questions then were, what is a cheese factory and how is it to be managed ? The late X. A. Willard, the late Harvey Farrington and others were the men who assisted to lead us, and we have continued to exchange views. At the present time some of our men—three from my own neighborhood—have gone to Wisconsin dairy school to learn more about their business. This is what I like to see. I do not believe in a man following a trade unless he is bound to excel in it. You have a perishable article to deal with—the most sensitive that I know of—so easily affected in so many ways, and unless a man is an enthusiast and is bound to excel he will never make a successful cheesemaker. And these young men are our best. The very fact that they have gone there, that they may see something, incurring all the expense themselves, is evidence that they are of the right stamp.

Then as to the importance of having a cheesemakers' union. I have talked that for several years. What Prof. Robertson has said is the case. Twenty-five years ago, twenty years ago, or fifteen years ago, who were the young men then coming to learn ? They were the most intelligent of men, the sons of the best farmers, and they were the best young men in the country ; because, I care not what line of life you take, you find the men who are the most successful are the men graduated on the farm. There is a mental fibre about them that you don't find about any other class. The prices paid them were higher than for ordinary farm work, and all were anxious to learn. At first they were willing to work for nothing and pay $100. Now the owners have largely become joint stock companies, the farmers only owning the factories. If this thing had been left to them to start I would not have liked the cheese they would have made ; they have not done much to develop the business ; but they are exceedingly anxious to cut down the prices. However, some of them have paid a little dearly for that, and we find, as a rule this year, that they are getting a little more liberal. But I agree with Prof. Robertson that the cheesemakers should meet and form an organization and adopt some scale of prices. Then you would find the best men would come to the front. We have made an improvement this year in this matter. Maybe it is the result of Prof. Robertson's talking to the owners. At any rate I know three factories where they have raised the prices this year. As to the poorest paid workers, we know how that goes ; they are willing to shirk anything and you know the reasan. Why ? They say "We don't get enough money to make good cheese ; we don't need to do it." This is the worst kind of economy. I do not know that there is much more that I can say now. The meeting is very thin, as is usually the case on the first day, although since we commenced the three day's Convention the thinness of the meeting until the evening of the first day may suggest whether we should have three days of it or not. I shall answer any questions, because I think there is always too little discussion. I have not so much faith in addresses, and have always thought we had too many papers and speakers.

Mr. Green—Has the Association taken any steps to secure an inspector or has any application been made to the Government to make provision for one ?

Mr. Ballantyne—Do you mean a milk inspector ?

Mr. Green—Yes.

Mr. Ressor—I see some of the county councils are moving in this matter. I think a short time ago the county council of Middlesex sent a notice to the county council of Wentworth, asking them to assist in having an inspector appointed, and it was unceremoniously set aside.

Mr. Ballantyne—My attention was lately called to a resolution which was passed at the June session, and a copy sent to the county councils. Now, in connection with cheese instruction, you are aware that this was combined as far as possible with inspection; but there can be no efficient inspection except by the management of factories. Let us see what this combined instruction and inspection means. Suppose one inspector has 60 or 70 factories, he can only test at one in a day perhaps, and he would be 60 or 70 days in going over the whole of the factories. Such a system of inspection is a mere sham. I have always felt that there can be no reliance placed in it. The men that this Association appoints should be merely for instruction. Some say the inspection might be done better, but it is impossible. You would have to have an army of inspectors. How would you support them? Are you willing to pay for it? Is that the proposal? If you asked the Government to pay for all this they would say it is your business to look after your own interests the same as in the case of any other manufacturers. There are things the state can undertake, but I do not believe that is one of them. I have run a factory from the very inception of the cheese industry, having shipped the first load of cheese on the Grand Trunk Railway, and I have never had a hitch or a misunderstanding with a patron. We are making more cheese to-day than we ever did, and I have no hesitation in examining every man's milk, and I have seen invariably that where factory men did that they had no trouble; but where they did not, trouble has arisen and sometimes resulted in the death of the factory. I recently got a Babcock separator for testing my own milk. There is no use expecting the Government or this Association to do this work. We were the first, so far as I know, to adopt the system of having cheese instructors. It has been productive of immense good, and has been adopted by others, but that is a different thing from having milk inspectors.

Mr. Schragg.—What is the price of the Babcock testers?

Mr. Ballantyne.—They are all prices. I think the one we have will test thirty samples at once. I think the price was $30 or $40. I did not consider the price. It was a simple question as to whether it was necessary.

A Voice.—How about sending out boxes with one scale?

Mr. Ballantyne.—The boxes should be all double scaled. Quite a large percentage of western cheese is shipped through; they are not touched from the time they leave the station until they reach their destination at London or Liverpool. Those shipped from New York are nearly all overhauled and put in fresh scale boxes. Others, of course, only get the one, and no cheese should be shipped out at any season of the year without two scales on each end of the boxes. There are plenty of factories that do this; but there are others which do not care a rap about the reputation of the goods. I never did send a cheese without a double scale box since I was told to do it, and since I have had experience in seeing the boxes with two scales at each end.

Mr. Casswell.—I have no doubt from what we have seen we are imperilling our reputation by shipping in these single scale boxes.

Mr. Ballantyne.—It is not to be considered. In sending out notices to factories we have a printed form to fill up, asking for double scale boards. I often said I would like to see the boxmakers form a union, so as to increase the price for a good box, but the cheesemaker has been left to cry down the boxmaker, so long as he could get the boxes cheap anywhere.

Mr. Butchart.—What is the effect if the cheese are not the size of the boxes?

Mr. Ballantyne.—They should be the size; but above all things don't let the cheese be higher than the box.

A Voice.—Should the lids be nailed?

Mr. Ballantyne.—That is a matter of opinion. You may do as the shippers want them.

Mr. Fewster.—You said that joint stock companies cried down makers' salaries. Do they do it more than the private factories

Mr. Ballantyne.—We have so few private factories, I cannot answer. I know I have a private factory and I don't do it.

Mr. Fewster.—Of course you are an exception, but do the general run of private factories pay more than joint stock companies?

Mr. Ballantyne.—I believe in our part of the country the joint stock companies pay a little more than the private factories. The trouble is that when they open the tenders they generally take the lowest, but some of the factories this year made a change in that respect. They did not advertise for tenders, but selected their makers and raised the price in every case. I cannot tell you how pleased I was to see that change, because the system of cutting down meant driving all the best makers out of the business.

Mr. Fewster.—When a patron was reported, or fined, perhaps, for sending milk that was watered or skimmed, I have known some joint stock companies which would not take his milk afterwards, while private factories would.

Mr. Ballantyne.—As a business principle we have adopted the plan of sending patrons away who have adulterated their milk. It is a very serious disgrace for a father or his family to be branded as milk skimmers, and the man owning a factory should not be hard, but being satisfied that he has patrons who are guilty of adulterating their milk he should expel them from the factory.

A Voice.—Have you any experience of milk brought to the factory in cans in which whey is taken back?

Mr. Ballantyne.—Many years ago I found the best factories were doing that. I found that it caused a bad flavor in the cheese, and began preaching against it through the press, and in season and out of season, and there is a great improvement in this respect. If you can find anything so sensitive as milk, I would like to know it. Think of the risk you are running of some careless individual neglecting to thoroughly wash and scald his cans. Then another reason against it is that milk hauling costs more. Another reason is that the tinning of the cans gets eaten away very soon with sour whey, and then it is impossible to keep the cans clean, and it costs more for cans. The whey could be sold to companies for feeding hogs. Speaking about the effect of taking the whey back in the milk cans you have all heard of the Elma factory. That neighborhood, where we get as good cheese as we get on this continent, was once making cheese so poor that I did not know what was wrong with them, and I called it the "Elma flavor." I once shipped this cheese in the ball; it cut nicely, but had a nasty, "buggy" flavor. I was in England in the spring and the buyers could hardly sell it; they had to sell it finally at 20 shillings under fine. Looking into the cause I came to the conclusion at last that it was sour whey. The owners called a meeting of patrons and decided not to send back whey in the milk cans, and they have had fine cheese since. I think the thing is all wrong together. The difference in the price that is paid for an extra fine cheese and an ordinary one is so great that it is worth while using every precaution; and it is these very fine factories that have enabled you to get the price you do for your cheese. I say this, that the highest price is paid for poor or secondary goods in this district which is paid on this continent; and why is it? Because this district has got a reputation and buyers send for your cheese; and the reason is on account of a limited number being exceptionally fine.

Mr. Green—Would you put the brand of the factory on the boxes?

Mr. Ballantyne—I would not advocate that. Every one knows that a factory may make a very fine article one month and very poor the next month. There are very few factories you can depend upon for getting the cheese uniformly fine.

A Voice—What is your opinion as to feeding rape?

Mr. Ballantyne—There is no doubt the milk will be affected, but the feeding of rape in the fall depends on the way it is done. I would not allow patrons to feed Swedish turnip tops at any time. We feed on my own farm gray stone turnips after milking; but I cannot imagine, if the cows are allowed to feed on rape, but that the milk will taste and make a very inferior cheese.

Mr. Casswell—Rape is ten times worse than turnips or turnip tops.

Mr. Ballantyne—I believe in feeding a little turnips once in a while. It will increase the milk, and if fed just after milking, the milk has very little of the flavor.

A Voice.—Which takes the market best, cheese with a little color or highly colored?

Mr. Ballantyne.—It is a matter of opinion. To-day colored is preferred; but there are districts where they prefer the white. The consumption of the white has increased. The time was when they were not consumed. London, for instance, did not take a white cheese. The working classes there, and people in the north of England and in some districts of Scotland use the colored; and you have other districts where they prefer the white. If white is in demand they rush into the colored, and if colored is in demand they rush into the white.

A Voice.—We would like to have your views as to airing or cooling milk, or both.

Mr. Ballantyne.—There is no question they are both right; but see that the utensils are clean. People are apt to trust too much to a little water which is inconsequential. I will tell you what my experience has been last year. We had a very cool year, and with a view to assisting our patrons I gave them each an aerator. We never took more milk to make a pound of cheese than we did last year, and I do not know; but I think the people trusted to putting the milk through the aerators once. In cold weather it is more important to aerate the milk in order to prevent the waste of fat, and it is the extra fat that brings the extra price for cheese; and I am afraid there is a great deal of the loss caused by not stirring enough to make the separation perfect.

Mr. Casswell.—Some 16 or 17 years ago I bought a factory's cheese near St. George. I found a bad smell of turnips in the factory. The owners said it could not be, as there were no turnips in at that time. We "pulled" the cheese and knew at once it was rape. I said I could not take the chesse. They found one of the patrons had been feeding rape regularly to his cows The result was that they sold for several cents below the price that was offered first. It is bad to skim a little, it is bad to skim much, and there should be no skimming at all, and there should be no rape fed at all.

The convention adjourned till 7.30 p.m.

EVENING SESSION.

The convention resumed at 7.30. Mr. Thomas Ballantyne, M.P.P., was the first speaker, his subject being:

EXPERIMENTAL DAIRY SCHOOLS.

He said: Owing to circumstances over which I have no control I will not be able to remain during the whole meetings of the convention. This I very much regret. You all know my interest, and if I have felt it more my duty, in connection with one thing and another, it is to aid to the fullest of my ability everything in connection with the dairy bnsiness.

It may be as well, in order to understand the question, to take a brief retrospect of the dairying business in this country. Those of you who are old enough, remember that some thirty-five years ago an immense number of cows were bought here and shipped to New York State, their milk to be manufactured into cheese and the surplus product to be shipped to England; and while we were asking ourselves here could we not do the same, the system was introduced into this country, and principally, I may say, owing to the late Harvey Farrington, of Norwich, who is justly entitled to the title, "Pioneer Dairyman of Canada." Remembering what he did, I say it would be difficult to find an individual in all respects so well qualified to do what was then required. When he started, he had

visitors from all parts of the province to learn what a cheese factory was. The result was that cheese factories were introduced into this country and dairying spread very rapidly. Had it not been for his efforts in connection with the cheese factory system the growth and development of the industry must have been very slow, but as it was it spread very rapidly and we became soon large exporters of cheese, It is true, at first our goods were occupying a very inferior position in the English market, selling lower than American cheese which was then made mostly in New York State, in Oneida and Herkimer counties, and it was thought there was something peculiarly adapted there for the manufacture of a fine article. They had very fine grass land and the country was generally well watered, and it was not thought we would become formidable competitors in the markets of the world. This was the position at that time.

By-and-bye we began to improve and there were a small number of factories producing, I think I can say, a very fine article. At the Centennial Exhibition we were successful in carrying off the highest honors, and that was important in giving us a standing in the markets of the world. However, it was seen that something must be done to get a larger percentage of fine cheese, and the question was in what way we could improve the whole product. The result was the Western Dairymen's Association of Ontario was the first to suggest the idea of employing instructors as a means of communicating information and showing makers the correct process of regulating the proper proportion of salt, the development of acids and everything in connection with the manufacture. The result was we had a very decided improvement. Cheese made in eastern Ontario at this time was selling at one to one and a-half cents per lb. less than western cheese, but they followed our example, the result being that their article brought equal prices with ours the past season. They were perhaps better situated than us; they had been dairying previous to the introduction of cheese factories, they understood the care of stock, they had been making a better quality of butter, ours was about as bad as could be. That was our position then.

What is our position to-day as a result of our care? Our cheese sells higher as compared with New York State and the Ingersoll district—meaning by that all west of Toronto—has best reputation and commands highest price of any American cheese on the English market. Looking, before I came to-day, at the *Grocer*, published in London, England, which contains a record and the transactions and the advertisements of all the leading men in the cheese trade, I notice American cheese is quoted about four shillings under best Canadian cheese.

So far we have done very well, but I still believe we can make a very great improvement. I remember a few year ago when Scotch cheddar cheese, made in the dairy districts of Scotland, where they are doing nothing else and where they are keeping pure Ayrshire stock, occupied a very inferior position in the markets of the world. In England our cheese would sell higher than the finest Scotch cheddars. But they have been taking a leaf out of our book. A gentlemen interested in the business, Mr. Wallace, happened to be on a visit to this country and spent a week with me discussing every matter in connection with the factory system. I suggested the formation of a dairy association, and said by that means the practices and principles of cheese-making could be clearly explained, because every day convinces me that while our meetings have been of immense good, yet it is actual demonstration that can do the most good, and when you consider how delicate a thing cheese-making is and how much difference there is in the value of the goods on account of quality, you must fully recognise the importance of every particular being fully attended to. I was present at the formation of the Scotch Dairy Association in Ayr. They decided to employ instructors, and instead of employing one of their own number, they applied to me to recommend one from this country as cheese instructor to do similar work there as is done here. They have now gone a step further and have established dairy schools in connection with their work of instruction. Now, if that is necessary there I think it is more necessary here.

But let us look at the position of affairs where these schools are in existence. I found last year on a visit to Scotland that the finest Canadian cheddars were selling at 43 to 44 shillings, while their finest cheddars were selling at 60 shillings. That was a

great difference, and it is a difference which concerns the farmers, because the cost of manufacturing good cheese is just the same as of manufacturing poor cheese. The demand for fine cheese is always good, and looking at the *Grocer* of to-day I find that fine is scarce, and common plentiful, with a dull sale. Now, I have felt that the advantage of having dairy schools as compared with the employment of instructors is very great indeed. Let us look at some of these advantages. We employ a number of instructors; they can only visit one factory a day; each instructor has, say, 60 factories. Of coure we have a number of factories making very fine cheese; but there are a number making a very poor article indeed, and we must not think that we have reached that stage at which we can do without instruction. If we had dairy schools the makers could go to these. There could be half a dozen such schools. The makers could all make arrangements by which they could get away for a day to visit the schools; and if we could improve the product—if we could raise the quality of the whole product—(because we must not think they are all as fine as they should be, and the result is that the poor ones drug the market) it would be a great step forward.

I visited these dairy schools in the old country. Before the introduction of these methods to improve the qualities I was struck with the small quantity of really perfect goods, and I now saw the immense advantages there of these schools. They were all private dairies, they were in the hands of intelligent men, but they had no means of informing themselves. The maker was comparing himself by himself, or herself by herself. The result of these dairy schools is that a large percentage of cheese are almost as fine as can be made. There is an immense difference, and it is not that there is such a difference in the value of the article, bucause we know it is not really worth 3c. per lb. more as a nutritious article of food, but the number of people who are willing to pay for a first-class article is getting larger every day.

Well, sir, we go further. I have told you that I spent several days in visiting those dairies, one day with Mr. Drummond, and several days with a gentleman who had very much to do with the establishment of the Association. I was amazed at the immense improvement in the quality of their goods. We found a small percentage that were not really fine, we found a large percentage that were clean, that were sweet, that were nutty and stylish, and this is largely the result of the means that has been used there to improve them.

There is a great show held in connection with what is called the dairy fair, at London, and out of 90 exhibitors 78 were from the district where these dairy instructors had been employed. Some dealers did not believe that such fine cheese could be made in Ayrshire as they made; but they took all the prizes but one, and that was a third class prize. They did more, they took the sweepstakes prize for the best of the ordinary. There were 78 exhibitors from Scotch dairy districts out of 104, an evidence of the interest and emulation these schools have excited.

Later we find the great cheese fair at Kilmarnoch takes place, undoubtedly the largest cheese fair in the world, and where they take the greatest possible interest in the subject; and the result was there we found the difference between Canadian and old English cheddar systems of making, the Canadian carrying off the day in the most decided manner, these instructors being all Canadians, whom I had the honor of selecting; and here it is (reading from the *North British Agriculturist* of October 29th):

"The great feature of the Kilmarnock cheese show last week was the extraordinary success achieved by Mr. Robt. Wallace of Auchenbrain, who has now the championship of the show for the second time in succession. This year Mr. Wallace has not only won the championship but also carrying off over £80 of prize money. I find these cheese are all made strictly according to the Canadian system as taught by Mr. Drummond, and his cheese which won the sweepstake was declared by the judges to be as nearly perfect as could be."

All the other Scotch papers in reporting the show testified in a similar manner to the superiority of the Canadian system. Now, I had visited that gentleman's place and found he was an enthusiast. There is no man who will ever excel in the manufacturing of dairy products unless he is an enthusiast. You are handling the most delicate article in the world, and the slightest departure affects the quality. This instruction may not

enable us to make a prize cheese exactly every time, but it will show us the system we are generally pursuing, viz : the time to add the rennet, the quantity of salt to use and all those things that go to make a really perfect article.

Now, sir, I felt we had to go a little further. Our instructors have done good, our associations have done good ; but I felt we ought to go farther ; that we ought to do better if we had two or three dairy schools. I don't mean to make cheesemakers there, but those who are already engaged in the business could go and see the later improvements and be stimulated to still further efforts. I have often found cheesemakers doing poorly ; it was difficult to find them going to another cheese factory to get lessons ; they thought they would lose prestige by doing so. We have even had to have recourse to drastic measures and tell them to go to some other cheese factory to learn. I have not seen them do so without being improved, if at all capable of improvement. I remember one case in which the cheesemaker had got off the track—and, mind you, the most skilful and intelligent men are very often apt to do so, and the result was he had a lot of inferior goods which were unsaleable. I happened to ship them. I said go to a certain factory and see how they do there ; he went, and I may say he has not made an inferior cheese since. Well, coming nearer home, during the past season we found several cheese factories not one hundred miles from Woodstock which were making a large quantity and not a good product. They went to a neighboring factory to spend a day and compare notes, and I don't know but the pupils obtained more than the teachers for the remainder of the year, and demanded the highest prices.

I think further, sir, we have reached a time when more attention must be paid to testing milk. We must pay for milk according to results. I know I was one, when this was first suggested, who thought it an impossibility ; but our best dairymen, our most intelligent dairymen, are now beginning to discuss it. In connection with the meeting of my own patrons of Black Creek factory, a motion was passed unanimously, in favor of its adoption as soon as practicable. A dairy school would be in touch with all the improvements we are making from time to time. Our own men would go there, and there is no doubt others. Here is a machine called the Babcock testing machine. I think that tests 24 samples in a very few minutes, showing the exact butter fat contained in the milk. Now, at our dairy schools the makers would learn the use of new appliances. Our past experience should make us realise that we need these schools, and as I mentioned this afternoon four of our young men have gone all the way to Wisconsin to take advantage of the instruction offered in dairying schools there. Now, we want to do this work at home.

We go further. If the best results are to be obtained, as Prof. Robertson said this afternoon, we must make butter in winter, and cheese in summer, and the dairy school would be to teach butter making in winter and cheese in summer. You will never get the best results unless that is done. The winter is not the time for making cheese, but it is the time for making butter ; and, even at present there is an unlimited demand in Canada for pure, fresh butter. I hope before long that the supply will be in excess of the demand and then we can ship to England—because the duty would prevent, even if prices favored us, from shipping to the centres of the United States. There can be no doubt about the advantage of such a change. Having the cows calve in the spring and giving milk for six or seven months is not beginning to do all that can be done. Having tried it on a small scale myself, and making between 60 and 70 lb. of butter per week, the result is we have no difficulty in getting 25c to-day in Toronto. Now, winter dairying will stimulate the farmers to feed better ; and they can get better manure. A difficulty about the time the factory system commenced was crowding the calf for milk. Now, there is nothing to prevent the calves coming in the fall and after a week or two you can give them skimmed milk.

There are some reasons, which, to my mind, render it important that we should make this further departure. I know the difficulty there is about carrying on these things. I know the great demands upon a voluntary association such as this, but I think this is one of those things where the State could assist.

The proposal has this further advantage : Let the results be carefully tested and published, and, while I am not sanguine enough to think that every farmer would at once

follow this example, they would in a very short time follow it. If deep setting were adopted (I am setting in the highest cans) the cream could be hauled once a week and each individual paid according to the value of his cream, because there might be a difference in the quality according to the different modes of separating the cream from the milk.

Now, I wanted to bring this matter up; it was impressed upon me so strongly this year in Scotland, and the whole of the papers, the *Grocer*, the *North British Agriculturist* and the rest of them give very full reports, and all giving credit for the great improvement to the introduction of the Canadian system and schools for the proper teaching and selling for a difference of 3c per lb. over best Canadian. I will say, there was a richness about their cheese that is not in our cheese, and the consumer, for that nice, nutty flavor, is willing to pay the difference. I do not think it is from the richness of the milk, and I have thought that a great deal of this want of richness in our cheese came from not properly stirring the cream in the milk and preventing a separation which is never afterwards thoroughly incorporated. Do not take any risk in this matter. We have been insisting upon cheesemakers trying to educate the farmers to stir their milk. The last year was as favorable a season as we could have, for many reasons, yet we find it has taken a large quantity of milk to make a pound of cheese. I think, on account of the low temperature, there has been a separation without stirring. In order to emphasise the importance of airing the milk and to keep up the enthusiasm amongst our patrons, I gave each of them an aerator last summer. Now, what I am going to state may not be anything against the aerators, but I think the patrons trusted too much to them. I felt confident that we should see that they do not allow the cream an opportunity to rise in cool weather. We want to see to it personally. Make it part of the business; not going to an individual suspecting that he is doing what is wrong, but making it part of the business to see that he is taking care of the milk.

Now, these are some reasons why I think dairy schools, or experimental stations, are wanted. My idea is to put one of them in the west and one in the east. I do not advocate this because I want one at Stratford; I don't know any place more suitable than Woodstock. I would like something more than that; I would like a dairy farm in connection with the school. I would make that experimental; I would keep dairying stock there exclusively, having the calves come in the fall. I think we could make one-third more from this than by having the cows calve in the spring in the ordinary way. In my own dairy we weigh the milk of each cow every day, every ounce, so we know what every cow is doing, which is the only way to fully realise the difference between a good and bad cow. I had a cow that gave 11,000 lb. milk in 10 months. I am satisfied if we had kept on the old way she would never have done that. There is no question about winter dairying paying if you can get 25c per lb. for your butter, and no doubt you can get that so long as you manufacture a superior article. I make my own butter on the farm. I am not advocating that, but the cream can be hauled to a factory in connection with the cheese factory at a very small cost. By getting a very large quantity of butter, from what might be small quantity of cream from each patron, you can get the very highest price. As I said, I would have a farm in connection with the dairy school, keeping, say 30 cows, and have the information as to what was being done there disseminated all through the country. A private individual may make an experiment and the result may reach your next neighbor, but it does not reach the same number as where an experiment is carried on under the State, when the result is disseminated through the length and breadth of the country. Now, I hope you will have a full discussion on the subject, and I am willing to answer any questions. I was very much pleased this afternoon at the turn the meeting took. It has always been one of my regrets that the time was so much taken up with papers and not so much with discussion. (Applause.)

Mr. BUTCHART.—Have those cheese that took the prizes been made principally in private dairies?

Mr. BALLANTYNE.—All in private dairies. There are no factories in Scotland.

Mr. BUTCHART.—Would that account for their milk being richer? There is sometimes skimming here.

Mr. Ballantyne.—I am not prepared to admit that. Don't let the world believe it. It is the meanest kind of stealing. I know of no kind of dishonesty so disgraceful as the skimming of milk. The person who does it would not dare to do it in the presence of his hired man, and it must be with the knowledge of his own family. I admit there are isolated cases, one or two in each factory, but that is about the extent of it, and I would favor, as soon as possible, wherever proved, expelling them from the factory, and that is the best way to cure that. Mr. Butchart suggested that as a reason for the difference in richness; I don't believe that. I believe there are a number of factories where there is not much of that and where the character of the people is a sufficient guarantee against tampering with the milk. I cannot but think that Mr. Butchart has run a factory long enough to know that patrons cannot skim their milk without exposing themselves to great risk.

Mr. Butchart.—Allow me an explanation. There are a great many who do not think it is at all wrong to take a teacupful of cream off to use in their tea. Men have come to me, apparently as honest as anyone, and told me they do it and they will do it whether you are there or I am there. A hundred men in one vicinity would be as honest as in another. A teacupful, you see, taken off by each of one hundred patrons would mean a great deal to the richness of the cheese made in that day and certainly a great deal to the average made in a season.

Mr. Ballantyne.—I am very sorry to hear it. I understood a few in one of my factories took off cream for coffee and we stopped it very promptly. There may be some localities where it is done, and if so that accounts for their inferior products and for their taking a low price. If factory managers knew of it and allowed it there was certainly something dishonest, for if each man was allowed to be the judge of his own cupful one man would take off twice or three times as much as another.

Mr. Lossee.—Do you think the effect of the cheese being made under the farmers' own supervision in Scotland would be to produce a better quality of milk and make a finer cheese? I think so.

Mr. Ballantyne.—I will not pretend to say that there should not be a delicacy of flavor that ours has not; but I will say this, that the patrons can attend to their own milk so that it will arrive at the factory in perfect condition. First, they should see that the utensils are perfectly clean, scalding them every day. We have found that every pound of poor cheese diminishes the value of the goods. If a man takes home a pound of poor cheese it may last him two months, whereas a pound of good cheese would last him only a day perhaps, and it is because we have recognised this from the first that we have all been willing to exchange our opinions. I would say that I remember when watching the milk very closely in the factory, making the cheese myself and saving a sample of every man's milk, that a sample of milk which came the farthest was invariably good; no sourness and no taint about it. What one can do all can do; but if it is a mere question of getting milk enough, looking after it no farther, taking no means to see that you are really getting it right, then of course the maker is struggling with floating curds and everything else during the whole season.

A Voice.—I have seen butter fat seven or eight inches deep around the whey vats, and I would like to see it in the cheese.

Mr. Ballantyne.—It never became properly assimilated. Those of you who are using machinery if you cut the curd into square pieces find no waste from the manipulating of the curd, and those factories which have been taking the largest quantities of milk to make a pound of cheese have been most successful. I think it is chiefly owing to the nice milk, and corroborative of that I remember when we used to make twice a day and the majority then had agitators and the cream was never allowed to rest; but the moment we commenced to haul the milk once a day it took more milk to make a pound of cheese. The present arrangement is best if the farmers will only take care of their milk.

Mr. Lossee.—We want to know what effect these dairy schools would have on the product?

Mr. Butchart.—Mr. Ballantyne alludes to the richness of their cheese in Scotland, and he claims that they owe a good deal of this to the training they got in the experimental schools.

Mr. Ballantyne.—No, not the richness. Before these schools were started a small percentage of the cheese was fine, but a great deal of it was defectively made and got out of condition and in London they did not want it at all and could not sell it. I mentioned the character of the goods, but I did not say the richness. I referred to the extra qualities, the proper percentage of moisture, the solidity, the nice character, neither too much salt nor too little, and that the processes by which all this was accomplished showed that the pupils had been able to follow their lessons.

A Voice.—Supposing there was a dairy school. In one section the cows are salted regularly and in another section they are not salted. Would that make any difference?

Mr. Ballantyne.—The very greatest difference.

The same Voice.—I don't see then that the dairy schools would make any difference.

Mr. Ballantyne.—In disseminating knowledge, that is all.

Mr. Robertson.—I will read an extract from a letter bearing on the subject, from one of the most largely interested cheesemakers in Scotland; one who has spent a great deal of his time in assisting in the advancement of the dairy interest there. I wrote him some time ago as to what his opinion was as to how they had succeeded in improving the quality of their cheese. You know their surroundings, their cattle, their pasture, their manner of feeding. There is very little change in regard to these, and the most of the change that has taken place must have been simply in the manipulation of the milk. I asked in my letter if he could give me just what he thought had been most conducive to the great improvement, and he replied as follows:

"Regarding your enquiry as to dairy schools, with us *versus* instruction, I am of opinion that the latter is by far the cheapest and attains the greatest benefit, as with a few instructors going around the whole of the matters can be got at with a very moderate outlay of cash, and by this means we have made great progress with our two instructors."

Then he refers to the schools:

"However, if the means are available, a dairy school is of great benefit to those that are situated near the school, and more specially to young people who mean to make dairying their business. We find it rather expensive, however, and but for a government grant of £200, and something like £500 yearly for subscriptions from the landed proprietors, we could not carry it on, as the fees obtainable would not avail to pay the costs."

If Mr. Ballantyne and some of our other dairy friends can persuade our Government to give us a dairy school, by all means let them know that we want to have it.

Mr. Ballantyne.—I want to emphasise one thing: There was a large percentage of cheese that we knew were wrong last spring and they turned out worse than we expected, and the result was very much lower prices. If we had a dairy school the cheesemakers could go there, and I have often seen a case where a cheesemaker was sent to a good factory to learn, and there was a difference in his work from the day he came back. Then there are many things that could be carried on in such a school. It would require a little money, but it does not require so very much. Mr. Robertson has referred to a grant in the old country. It is a remarkable fact that the only grant given by the Imperial Government to aid agriculture is a grant of £5,000 divided among the different dairy schools in Great Britain.

Mr. G. R. Pattullo.—Would it not be a good thing if this Association were to pass a resolution which might strengthen the hands of Mr. Ballantyne and other men in the legislature toward getting a grant. It seems to me that there can be no doubt if we are to have the character of our cheese raised to the same high standing as the old country cheese, this is an absolute necessity. Now, the only way in which expression can be given to this idea is to pass a resolution which will strengthen the hands of Mr. Ballantyne and other gentlemen interested in the dairy business. I would suggest that the matter be referred to the committee on resolutions.

Mr. T. J. Dillon seconded this motion which was carried.

THE FARMER AS A BUSINESS MAN.

Hon. H. C. Adams was again introduced and gave an address on the above subject. He said: Mr. President and gentlemen of the Western Dairymen's Asssociation: It seems almost too bad to snatch this convention from the subject of cheese-making to consider some other topic, for I see you are business men and many of you patrons of cheese factories, and that is a subject of vital interest to you. If I could have managed to satisfy myself I should have had Prof. Robertson to speak in my place. But I want to say, in reference to this subject, as I said this afternoon, that we have a dairy school in our State. We have there a State University, and connected with it a State Agricultural College which is practically a part of that university. We have also an experimental station under direction and control of Prof. Henry. There is placed under that now a dairy school. It is supported by an appropriation of $25,000 a year. We have located upon the farm a building which is known as the Dairy House, and the pupils are taken right into that house and shown the various processes in the manufacture of butter and cheese. We have not only a professor of dairying, but an accomplished agricultural chemist, and in addition, a practical man from the state of Illinois who has been known as the president of the dairy association of that state. We are already crowded for room to carry on this work and have struck out in no line that gives more hope than this one. I believe, here in Canada, where you are acknowledged as masters in the production of cheese, there is still room for dairy schools to do work.

It seems to me that if farmers are going to be business men, which I am going to talk about, they will have to stand up for themselves. It is an old saying that "Any fool can be a farmer." Any fool can be a lawyer, and some of them are lawyers; but no fool can be a good lawyer, and no fool can be a good farmer in these modern days. There may have been a time when a fool could be a farmer, but I tell you it hustles a smart man pretty lively now. (Laughter.) But there is a certain class of men who do get along in an average way on the farm. I come from the state of Wisconsin, and I see there farmers of every community, and every class, and every political belief, and every degree of mental ability, and I have talked and talked about this business of farming. Some of them say "We are going to the dogs; other classes are jumping on us, the railroads are squeezing the life out of us, there is something wrong about the government, and it seems to us the Almighty is against us." Right beside them we find men who get along well; even when butter averaged only 21 cents per pound, when we got 7 cents a pound for cheese, when oats sold—hundreds of bushels—for 25 cents, we found men making money and making it because they are business men. They apply to their business the same principles which the merchant applies to his business, and which the banker applies to his business; and if these men, have at least got credit for being business men they believe they have gained something.

Before I go any further let me say I like to see a man on a farm who has got some enthusiasm for his business, who respects it, who is ambitious to get on, who is always a child, who is always willing to learn even if his hair is white and there are wrinkles in his face. (Applause). The successful men go at their business and study it, and the first thing they do is to look at themselves and say, "I wonder what I can do best on the farm; what did the Almighty make me to do on the farm?" Maybe the man is best fitted for raising sheep, or it may be for raising cows, or to raise strippers, and like enough the Lord made him to make saurkraut, and like enough when he knows what he is made for he enters on that line. What is the use of a cowman trying to raise a steer, or a horseman trying to raise chickens, or a man like myself trying to raise beans? We can't do it. It is hard enough to succeed when a man follows the current of his ambitions. There are number of boys that are pegging right along after their fathers, trying to pick out the same tracks, and they don't get a cent richer and they don't stop to think what they are doing at all. Some of the boys think it would be sacrilege to get out of the ways of their fathers. I respect the boys who respect their fathers. It is the curse of our nations, and perhaps of every nation, that there is not enough respect for age and years in this modern age; but no man has any business

to do just what his father did. If he doesn't do better he is not half as good as hi father, because we know, standing to-day as we do in the centre of modern knowledge that our fathers have all along been coming up from darkness into light, and if a boy is as good as his father is he will do better, because he has his father's experience to start with. It is your business, young men, to stand upon the shoulders of your fathers, and, if you would be loyal to them, avoid their errors, emulate their virtues and go on from the point where they have left you. (Applause). I recollect when a boy on the farm we had a cow which gave two pounds of butter a week, and we wouldn't sell that cow because father had her for four or five years. I confess I had not wisdom enough to get rid of a poor cow until I got married and started out in business for myself, and had to get a living and to find out something about this cow business. Now, I want a man to go right on and think for himself; to act on the best judgment he has, and add to that the best judgment of every man from whom he can absorb wisdom and knowledge and facts.

There is one thing I notice a great many of our farmers do not do, and for that reason they are not business men. They do not keep a cash account. Now, that is a simple thing, but I find when I talk to an audience about it that not one in fifty of them do it. Like enough at the end of the year the farmer knows he is behind, but he don't know what particular account has cost him more than it has given him in return. If he keeps an account he can see like a banker where his money comes from and where it goes to. I find lots of farmers who go about doing this or that, but mighty little they know about it. I have known a farmer who thought clover grew seeds at both ends. (Laughter). I have known a farmer who did not keep a cash account, who, when two or three men were wanted to contribute toward getting some one to give an address at an agricultural meeting in his neighborhood, would say that he could not afford it, and then he would go down to the village and buy ten glasses of beer. (Laughter). Keeping a cash account makes a man acquainted with himself and enables him to do business like a business man.

Now, there is another thing; the farmer who is going to be a business man and a benefit to his class should conduct his business in such a way that the boys will take to it and like it. I don't believe in compelling a boy to be a farmer if he doesn't want to be one. I think if the Almighty has made a man that he considers he ought to be a lawyer let him go and be a lawyer, for heaven's sake; if he is so constituted that he wants to pull teeth, let him go and do it; but out of this class the farmers of this country want a greater portion. We don't want the young agricultural class continually drained off. We don't want the prize boys to go into commerce, trade and professions. We want some of them with us to help to build up this profession to which we belong. One way to keep the boy on the farm may be to drive a 20-inch spike through him into an oak tree, but it is not the only way. I am inclined to think one of the surest ways is to put a chain of gold around him and hold him there, because farming is a profitable business. We all like money, we like the comforts of life; and a boy is going into that line of business where he can get them, and he can get them on the farm. Not long ago I went between two towns in my state, a distance of nine miles about, and the friend who was with me, who knew every farmer on the road, said there were thirty men between these two places worth $20,000 apiece. See that the boy's life is not ground out of him. We can do something in that direction, and when the farmer runs business on business-like methods the boy sees logic in that fact. We can not only do that much but we can have some sympathy with the boy. I recollect I used to live on a farm and worked as much and as hard as any boy, and when I used to see other boys trotting off with their skates it positively made me think that farming was not worth a cent. At the same time we must not forget—and I don't forget, because I have been through all the hard experiences of farm life—that when a man is poor the business of farming is necessarily a pretty hard one; but a man of ordinary sense is just as certain to win in the battle of life upon the farm as he is to live, unless a special misfortune comes to him, and you cannot say that of any other line of business hardly. In the mercantile and manufacturing professions of the nation to-day I believe it is true that 90 per cent. of the men in business fail.

There is one trouble about farming, I will admit. We are isolated, and out of that come some of our weak points. We are apt to get down into ruts, and you will find

graduates of colleges and female seminaries going out on to farms and shrinking under the grinding necessities of their life or what they conceive to be the grinding necessities of their life. But this is wrong and it is not absolutely necessary, and the farmer who is a business man will get out of those ruts so far as he can and get into meetings of this kind where he can touch elbows and think with men who think as he thinks and live as he lives. In Wisconsin we are helping somewhat in these things by means of farmers' institutes, and in winter we get together and many of the farmers contribute something of their experience; perhaps telling something about a steer, or a cow, or a pig, or something about clover, and all go away richer and none of them go away poorer.

There is another thing that farmers ought to do to dignify and ennoble their profession, and that is be a little more cheerful. Over in Wisconsin we farmers are called a lot of Quakers. They say we are eternally protesting against everything, and it is a mere habit, to a greater or less extent, and we ought to look at life with a little more cheerfulness, with a little more of the spirit of that little girl living in a hovel in one of our northern states. She was living under the care of her grandmother. She was sick, and there came a change when the night had half closed. They were poor and there was barely enough to eat in the house. To keep the child from freezing her grandmother tucked all the clothing around her she could find, and still she was cold. Finally the old lady went and got some boards and laid them over her, and then the child waked up and said, "Grandmother, what do you suppose the poor children are doing to-night who haven't any boards to cover them?" And it seems to me the farmers, out of the fact that they have got the protection of a splendid government; out of the fact that there is a stability about their business which there is about no other, out of the fact that they come in contact with nature as those engaged in no other business do, out of the fact that there is in the air a sinewy and moral fibre which makes honorable, moral men, should lead them to cultivate their business.

Then, the farmer who is a business man ought to be a politician, not to get office but to have things in the state as they ought to be done. I like to see a farmer take an interest in the politics of his country. I like to see a farmer who goes to a political meeting and stands up in his manhood and says: "I am part of this government, upon me rests some of the responsibilities for the excellence and efficiency and patriotic administration of our laws." That is the kind of a farmer I want to see, and we are getting more of them in our country, and no doubt you are getting more of them in this one. We have agricultural demagogues, but the friends of the farmer—the real friends—are the men who say to him, "Stand up in the exercise of your rights, independently and vigorously, and vote your way through, not simply for the interest of your class, but for the interests of all classes. I have no respect for that farmer who thinks some other business is more honorable than his own. It is not. Any business is honorable which has in it room for honest thought. The man who drives shoe pegs and the man who practises law, and the man engaged in any business, who is sincere and pays attention to the work that God has given him to do, stand precisely on the same plane, and I like to see the farmers take an interest in the management of political movements, and not because they are farmers, but simply because when that sentiment is spread broadcast throughout this land and throughout the land from which I come then we shall have less evils in government and less evils in society. (Applause).

VALUE OF EXPERIMENTAL STATIONS.

Prof. Robertson, being again called upon, said: Mr. President and gentlemen,—I have been asked to follow Mr. Ballantyne and speak upon the value of experimental dairy stations. It is hard to hold the attention of an audience upon such a prosaic subject after being thrilled with the eloquence and good sense of our American cousin who has come over here to exchange dairy thought with us. It was my good fortune some years ago to go to Wisconsin and there meet for the first time the Hon. Mr. Adams, who was then a power in his own state; not to move political parties, but to lift the sluggish

farmer from indifference about the concern of his own business, to become a wide-awake citizen; and when I went back in the following year I could see, during my brief stay, a wonderful change for the better in the farmers' institutes of Wisconsin. The personality and efforts of Mr. Adams helped very much in accomplishing that. The farmers' institutes of the continent have become powerful agencies for the improvement of agriculture.

I am asked to speak to-night on the value of experimental stations to cheesemakers and cheese-making, and since the bulk of those present are cheesemakers I will intersperse my remarks with statements concerning experiments made last year and referred to by my friend Mr. Ballantyne.

The value of all experimental work is two-fold. Every act of investigation has in itself a double power of service. It is competent to discover, and every man who goes through the world with his eyes open knows how much need he has for additional knowledge from discovery. But the main value of experiment is not discovery, because most men are so far behind the leaders in every kind of experiment or investigation that they are not putting into practice one-half the truths that have been recognised. The other value is that of tuition, so that by repeated demonstration even those who are apathetic about their own business might be taught to put in force the truths taught by an experimental station.

Then, let me say this also, that the station should be a centre whence reliable and authoritative instruction in cheese-making should go out. Cheese buyers go around the country, many of them benevolent men, but more of them more anxious to make one-eighth of a cent a pound on every box they buy, and that is understood. Some of the best men know right well how to help a cheese-maker, and some others, with as good intentions, know only how to leave behind them instructions that may have most disastrous effects. All teaching is not reliable, and therefore we need a dairy station to which to refer for sound instruction.

Then these centres should be open to all comers. They should be open to the patron to learn how milk for cheese-making can be tested, and to learn how the Babcock separator distinctly discovers the exact per cent. of fat in milk. But the station should also be open to cheese factory salesmen, who by going to it once in a while and seeing how neat and fine and uniform in appearance were all the goods on the shelves, would go back wondering in the presence of a cheesemaker how they had got all the cheese of such uniform character. If you can stimulate a man into wondering why he is not doing good work, you do a good deal. So by way of illustration, when a buyer goes into a factory and finds the goods all uniform, in shape and appearance, he is prepossessed in their favour; but if they are not uniform in shape and appearance, he shall look out for the defects and will not have to look very long.

For the practical service of the cheesemakers who were not present at the last convention, I would like to make a few statements regarding experiments made in 1889 with a view to discovering the solutions of unsettled problems. My friend, Mr. Ballantyne, at the convention in London, proposed that experimental stations should be established. A resolution was passed at his suggestion, asking a small grant for experimental work and this work was carried on for a short time.

The investigation embraced "the effect of the use of certain quantities of rennet extracts upon a given quantity of milk and also the effect on the cheese when made." A vat was divided into three compartments, and the milk in each was not merely from the same patrons, but was precisely of the same quality, having been previously mixed. In the first, we used 9 ounces of rennet to 1,000 lb. of milk; in the second, 6 ounces to 1,000 lb., and in the third, 3 ounces. Now if any of you want to get the full details of these experiments you can get them in the last report of the Ontario Agricultural College, and I dare say you could get still a sufficient number of the special reports on these experiments. This was the first discovery: in the same quantity and the same quality of milk in three compartments, we put different rates of rennet extract, and there was no difference observed in the process of curing. Then the curing of cheese in regard to its rapidity does not depend upon the amount of rennet extract used. Hence the extract is not the curing agent, and its use is simply, so far as I can discover, to coagulate the casein of the milk and enable it to hold the fat so that there will afterwards be one-third fat and

one-third casein and one-third water in the cheese. Then the coagulation of fodder milk is more difficult than the coagulation of summer milk ; hence you should use more rennet extract when fodder prevails than when grass prevails. But a point not yet understood is this, that the coagulation of milk in October is also very difficult, and a larger quantity of rennet extract should be used in October than is usually put in. When cheesemakers have used rather more extract and rather more salt the October goods will be quite superior, and when cured at a proper temperature they will compare favorably with September's.

Then another fact noticed was this, that there is always a heavier body when a large quantity of extract is used with a sufficiently large quantity of salt to ensure the keeping qualities. The rennet enables the curd to retain more moisture, and the more moisture there is retained in cheese the more rapid is the fermentation that produces curing. Now, if you use an extra quantity of rennet without a sufficiently large quantity of salt, the cheese will not be preserved so well, but if sufficient salt is used, you can get a cheese that will keep. So another thing is, that we can make a heavy-bodied cheese by the use of more rennet and more salt than is usually applied.

Then this also is to be said, that the longest-lived cheese are those made by the use of the least quantity of rennet extract, all other things being equal, because the less rennet you use the less likelihood there is of retaining moisture, and the less moisture there is retained the less fear there is of fermentation. All fermentations act more quickly in the presence of moisture than in the presence of comparatively dry substances. Salt is opposed to fermentation. Therefore, you put in a large quantity of salt and you have a cheese with a rich body and still a good keeping flavor.

Then milk that is over-ripe or acidy requires the use of a larger quantity of renne extract to enable the coagulation by rennet to precede the coagulation by sourness or acidity. We have learned a few things you see : To use more rennet in the spring and fall ; to use with it more salt ; and to make coagulation perfect in this way.

In case of over-ripe milk another experiment was made with the use of salt. I won't weary you with the details. In one lot we put $2\frac{1}{2}$ lb. of salt per 1,000 lb. of milk ; in another $2\frac{3}{4}$ lb. per 1,000 lb., and in another we put 3 lb. of salt per 1,000 lb. of milk. A large number of cheese were made, and were judged both by myself at stated intervals, and also by Messrs. Robert Ballantyne and A. F. McLaren, and here are the conclusions of the examinations. There were altogether eighteen lots. Now, these were judged at intervals from the end of August to the end of January. The first lot in which we used 3 lb. of salt, stood 1st fifteen times, 2nd once, 3rd once, and equal once. The cheese salted with $2\frac{3}{4}$ lb. stood 1st once, 2nd fourteen times, 3rd twice, and equal once. That salted with $2\frac{1}{2}$ lb. stood 1st once, 2nd only three times, 3rd thirteen times, and equal once. You can see that the large preponderance was in favor of the cheese salted at the rate of 3 lb. per 1,000 of milk.

Now, the highest rate of salting gave the heaviest body. The larger the quantity of salt the drier is the curd, and the longer the time required for curing ; but in the making of cheese from spring milk I would never exceed $2\frac{1}{4}$ lb. of salt per 1,000 lb. of milk.

Mr. Ballantyne.—Don't you think a little less would be better ?

Prof. Robertson.—I say I would never exceed it. Even use down to $1\frac{3}{4}$ lb. Now, I need not give you a long statement of the third investigation. It was in the treatment of curd after the removal of whey. *One* lot I had stirred on a rack, with a strainer cloth, and it was then allowed to pack, and was turned over and turned and packed seven or eight layers deep. The *second* lot was stirred and turned and packed two layers deep. The *third* was stirred on the rack and stirred all the while afterwards. The experiments were made with the same rennet, under the same conditions, and everything else was alike. I was not the judge, but had the judging performed by experts at the convention. There were five lots of nine cheese each. Lots 1 were matted, packed and piled ; lots 2 were matted only ; lots 3 were stirred and not matted.

Mr. Ballantyne.—Never matted at all

Prof. Robertson.—Never matted at all. Lots 1, matted, packed and piled, stood 1st twelve times, 2nd once, 3rd five times, equal five times. Lots 2, matted only, stood 1st twice, second fifteen times, 3rd once, equal five times. Lots 3, stirred all the while, were 1st four times, 2nd four times, 3rd ten times, equal five times. Now, you see, no one of these treatments seems to be essential; and this is the average required to make a pound of cheese in August, weighed on the 3rd of January: by the matting and piling, 10.53 lb.; by the matting only, 10.60 lb.; by the stirring without matting, 10.74 lb. Those were the averages from the weights taken on the 3rd of January.

Let me quote a point here from the same report. That is this: Some cheesemakers are reluctant to believe that cheese shrink when put in boxes before being shipped when left a short time in storage. The average shrinkage from August 30th to October 18th was from 5 to 5.8 per cent. Then the average shrinkage by weight from the 18th October to January 3rd was 2.2 per cent., or nearly 2¼ per cent., making altogether nearly 8 per cent., or 8 lb. to the 100 lb. from the time the cheese were made until the 3rd of January. It sometimes does not pay to hold cheese past the time when they are best for selling to get ¼ cent more per lb. if you lose 2 to 3 lb. in the hundred. Then tests were made in setting some milk at 84°, 90° and 96° Fahr., and no appreciable difference was found.

I have gone over that perhaps as fully as I very well could do to-night under the circumstances, and in the time at my disposal, but you can see that there is still a great field open to those who will conduct dairy experiments, and the more authoritative that work is, the more serviceable it will be to every cheesemaker throughout the land.

I might cite a great many instances showing the necessity for dairy instruction; I will give you one instance to show the crying need of them. It has been claimed that milk for cheese making should be paid for according to the solids. The only test, so far as its service is concerned, is a test to discover the per cent. of fat. Now, that will determine precisely the value of milk for butter making, but will it determine the value for cheese making? It may or it may not, because so far as I know, no one has tried to find out. I propose in such experimental dairy stations as may be established that the exact quality of the milk supplied there be tried every day, and that all 3½ per cent. milk should go to one vat. The cheese from that milk should be kept apart and compared; and all 4 per cent. and 4½ per cent. milk should go to the other vats, and then with one season's investigations we would have some authority to say 3½ per cent. milk is worth so much relatively to 4 per cent. milk, and 4 per cent. milk is worth so much relatively to 4½ per cent. milk. Then if a factory is willing to receive any class of milk and pay for it according to its quality let it do so, and every man would feel that he was getting full value for what he was furnishing. As soon as you can make the patron believe that, you have put within him a strong element of attachment to his factory, which at present is absent.

Then as to the causes of cheese going off flavor, such stations could have cheese put to one side and keep it for one, two or three years. It would pay the country to have the best bacteriologist try to discover the causes and perhaps suggest a remedy. It would pay to have half a million spent on that if favorable results could be obtained, so that cheese could be kept without these continual risks.

Besides that, there could be done something to encourage farmers to go into the dairy business, realising that they could carry it on profitably all the year around, and if the first year a loss occurred in the running expenses of the factory, then the people could afford a loss on a few school houses for the benefit of the whole of the people of the Dominion. Assuredly I believe that these experimental stations would be very advantageous, and that the dairymen of this country need not do without them any longer if they make the Government know that they want them very badly.

Let me say in conclusion, that these stations would have a very wholesome influence upon the minds generally of the dairyman, as making him such a man, who, having a knowledge concerning the intricacies of his business would begin to esteem his calling at its true worth, and who would esteem it all the more highly because he knew he was putting his own thought into his work through his own hands. A man who blindly plans can never have manly respect for his vocation. When a man has his foot planted

firmly upon his knowledge he begins to realise that he is doing a man's work, and putting his knowledge into practical exercise is the pre-requisite of a man that distinguishes him above all other creatures for these reasons: first, because of material advantage, then because of social gain and respect from all other classes. It seems to me the establishment of experimental dairy stations should commend itself to every man who wishes the country to be in a prosperous state financially, that they may be in a better state in their citizenship. (Applause.)

A Voice.—Have you used salt in over ripe milk before you added the rennet?

Prof. Robertson.—I have used that but I have always found that a larger quantity of milk was required to make a pound of cheese, though I have not made accurate tests.

Mr. Butchart.—There is one point I would like to draw attention to. It is said that the matting process is nowhere. That is contrary to the way we have been educated in the years that are passed; but I also found out in my own experience that the stirring of the curd has been of no benefit at all. I never made as poor cheese as by the stirring process. I did it because it was advocated so much, but the cheese did not give me satisfaction and I quit the stirring process. I made others and gave the curd the double matting, and they gave me altogether better satisfaction. I have found out that the curd that has been treated to excessive stirring did not have that nice flavor that the other cheese had. Well, now, I have been revolving in my own mind how that could be accounted for. I have accounted for it myself. I may not be right. There are certain flavors that taste nice in butter and cheese. We like to get them. Any flavor that smells will escape. The smell from a bottle of the esence of turpentine will soon fill this room if the cork is taken out. These flavors are not like the spores or germs which cause putrefication, and they do not breed, but are becoming less and less as they are exposed to the air. I contend that by stirring we have been taking these flavors away, and also inducing the curd to take in other odors.

Mr. Ballantyne.—The time was, fifteen years ago, when the curd was stirred perpetually, but I am not aware that any makers have been making on that principle since. I remember that I never saw finer cheese than came from one or two factories before there was any matting. Of course it is impossible to keep the cheese without some matting, unless you stir the curd and get it to dry. But I think Prof. Robertson's experiments are of the greatest value in connection with rennet. It was taken for granted that rennet is the active agent in curing cheese, and to him is due the credit of proving that it is not. It enabled makers to know that they could use rennet more freely, which was necessary, in the spring of the year than later on. As he has remarked, when milk is over-ripe you can use more rennet, without any danger or risk, and get a very good cheese. Then the fall cheese was not fine, it was uneven and limp. It used to be that buyers would not buy fall cheese; now the ripening of the milk more has something to do also, and as he has said, you get as good cheese in the fall as at any season of the year. These are experiments of the greatest possible value to cheesemakers, and let them see that they act upon them.

Mr. John Robertson, (London.)—There is another point I want to mention since you are discussing the action of rennet on cheese. I went to talk to several makers last summer. During the summer they were troubled with the cheese—not being able to get a good, solid, smooth rind on them, although they had been careful. I asked them how much rennet they were using and they said $2\frac{1}{2}$ ounces of extract per 1,000 lb. of milk. Now, I said, in the summer time that is too little. I am not prepared to say that using an ounce more will prevent your trouble, but it will in a great measure, and I could scarcely persuade them to use an ounce more rennet. I was in a factory this summer where they had a quantity of milk which was a little too ripe. The maker said: "What will we do with this?" I said: "It will scarcely stand heating; it is too ripe; you give it double the quantity of rennet and I will take the risk." We put in double the quantity, and the curd was ready for cutting in less than ten minutes, and when the cheese was cut up it had a splendid rind upon it. Now, I was going to tell you that not one of those five or six men that were troubled with cracking cheese and who used an ounce more rennet were troubled in that way afterwards.

A Voice.—Which lot of milk made the best average?

Prof. Robertson.—The average was precisely the same—10.88—in all cases of the tests with rennet. Let me say this, that in those cases it was a test of rennet against rennet. In the matter of stirring: the curd with the most rennet was doubtless stirred rather longer than the others, because it is essential in cheese-making that the curd and the whey be separated in a large measure before the matting. I am on the programme for a talk on the dairy farming of Canada to-morrow, and if any cheesemakers want an answer to any questions I would be glad to answer them at the opening of the convention in the morning. I would like to say that in other provinces besides Ontario experimental stations are badly needed. I will give you one illustration: In the Island of Prince Edward—the gem of the Maritime Provinces, and perhaps the gem, in quiet beauty, of all the provinces—cheese-making was started a few years ago. The man that originated the business lacked something, and after a time the factories all closed up. Perhaps the island is best adapted on the whole for making the best cheese in the Dominion and there is a prospect of the industry being re-established. Meanwhile I have committed myself to finding places in the best cheese factories in Ontario for eight or ten young men from Prince Edward who want to come and learn the practical part of cheese-making for a whole season that they may go back and correct wherein their fathers erred. I would like to get the names of a few of those who want to have a young man to learn and who have well-built and well-equipped factories, and who—rating yourselves with all due modesty—consider themselves first-class cheesemakers.

The Convention adjourned till 10 o'clock to-morrow morning.

SECOND DAY.

The Convention resumed at 10 o'clock.

NOMINATING COMMITTEE.

Mr. Fulton.—Last year and the year before a little difficulty was experienced in the working of the Nominating Committee on this point, that a number of the committee—I think four—were on the Directorate Board, and even the directors themselves felt that it was an awkward position to be in to have a fraction of the committee nominating and supporting themselves as directors for the coming year. It has been suggested that in making your nominating committee this year none of the directors be appointed on it.

The President.—I think there is no director, after what has been said, would sit on that committee. Therefore, in making nominations you will please leave the directors out.

The Nominating Committee was then elected as follows: Messrs. John Fulton, Brownsville; John Geary, London; James James, Nilestown; Robert Facey, Harrietsville; Robert Ballantyne, Stratford; Harry White, Pine River; J. W. Scott, Sparta.

Letters were read from Mr. W. W. Huston, Principal of Woodstock College, inviting the members to visit that institution; from Hon. John Carling, Minister of Agriculture, Ottawa, acknowledging receipt of invitation to be present at the Convention; and from Hon. John Dryden, the Ontario Minister of Agriculture, to the same effect, and stating that he would make it a point to be present during some of the sessions.

QUESTION AND ANSWER.

Mr. Scott.—I would just like Prof. Robertson to be a little more explicit than he was last night, in regard to the use of rennet early in the spring and late in the fall?

Prof. Robertson.—A very few words will suffice to make clear what I said. The use of rennet is for the purpose of coagulating the casein in the milk, and in the spring it is difficult of coagulation. Therefore, every cheesemaker, to avoid all leakages, should use enough rennet to coagulate the milk in 15 to 16 minutes, fit for cutting. Then, to prevent having cheese which is very dry or stiff, a cheesemaker should not use more than 2¼ lb. of salt per 1,000 lb. of milk. When the cows are in the stable, fed on dry fodder, I think he should not use more than 1¾ lb.

Mr. SCHRAGG.—In any kind of milk?

Prof. ROBERTSON.—I don't think it would make any difference, only this, that in very soft curds some of the salt may be washed off with the whey. So a cheesemaker's training should guide him for adding just so much more salt if some of it has been drawn off by the extra whey. In the fall the coagulation is not quite so thorough. Therefore in October I would use enough rennet to coagulate the milk in not more than 35 minutes fit for cutting, and then I would see that the curd was heated to 100 degrees and kept at that temperature. Then I would add 3 to 3¼ lb of salt per 1,000 lb of milk.

A VOICE.—Would you advise us to set our milk at 88° or at 90°? Which do you think would be best?

Prof. ROBERTSON.—Except in the case of milk that is over-ripe or over-acid it makes no difference. I spoke of experiments last night of setting at three temperatures. In these the milk was set at 84°, 90° and 96° and we found no difference. I believe the setting temperature makes no material difference, except that acidy milk can be coagulated always more perfectly at a high temperature than at a low one

A VOICE.—How would you handle milk that has a strong flavor of turnips so as to produce a fine-flavored cheese? (Laughter).

Prof. ROBERTSON.—I suppose the man who wrote this thought it would be an impossibility to give him an answer equal to the occasion. I would trade that milk off for milk from cows that got no turnips. (Laughter.)

DEHORNING CATTLE.

Hon. Mr. ADAMS, in reply to a question as to the effect of dehorning cattle, said: Of course there is not time to go into that at length, but during the last two years we have tried dehorning cows in Wisconsin. A great many who handle cattle have been dehorning. It is quite true that sufficient time has not elapsed to determine the effects of that process upon dairy cattle, but we do know this, that the experience of stock farmers has been in favor of this process. I recollect meeting a Scotch farmer in Dane County who had about 300 dehorned, and he said he would not have the horns put back for $500. Of course there are certain advantages which are obvious, and one is that you can turn steers together in a shed without any danger of them injuring each other, and you can get a larger number of them together in a given space, and you can handle them like a flock of sheep. Not only this, they don't fatten so well with the horns on, and when they are dehorned it don't require quite so much labor to feed them. When we come to the details of the process it is urged that it is a very cruel practice, but most of our men who have practiced it don't think it so. It is a very brief operation and the pain does not begin to be so great as during that certain other operation in the animal's life. Men who complain about it and who belong to humane societies have tried to stop the practice and have carried the matter to the courts and been beaten every time. I am a dairyman; I raise dairy cows and could dehorn them and would do so, but for one reason, and that is I like to see the horns. In my experience I have found them to be a device of cruelty. In a single year I think that one cow suffers more from the horns of other cows, than a whole herd would from the operation of dehorning. Then, as I said, the operation is a very brief one. A man will go into a herd of 80 and dehorn the whole lot in three hours. Governor Hoard maintains that if practiced the ultimate effect would be towards the beef side; that it will cause a cow to lay on flesh faster; that it will turn the process of making milk, into the process of making meat. Whether or not it takes anything from the vitality of a sire is something I don't know, but I have met men who have been dehorning seven or eight years and they say the sires maintain their vigor.

Mr. SCHRAGG.—What time would be the best to dehorn?

Hon. Mr. Adams.—It is a disputed point to some extent. It is claimed by men who have studied this question that it is not advisable to take the horns off calves for this reason, that when they mature they never know they had them and acquire a habit of bunting, which is just about as bad as hooking, but when taken off after they have got into the habit of using them, it is said to make them extremely tame and mild and tractable. I want to say they are using some sort of chemical now in our state which is put on young calves and prevents the growth of horns entirely, and I understand that the application of that mixture is not attended with much pain.

A Voice.—I want to ask if the male and female were dehorned would there be any horns on the offspring? (Laughter.)

Hon. Mr. Adams.—That is a fair question, too. I think that probably there would for a time, but I do think, that if you kept dehorning these cattle for generations, finally the horns would disappear altogether. We know this, in ages past, when cattle were wild they had very large, strong horns. They had to fight to live and those with the longest horns and largest muscles survived in the struggle for existence, and when men got hold of them and they were taken care of and did not have to fight for a living, then the horns began to grow smaller until we have that highest product of cow science, the Jersey. The horn has disappeared because there has been no use for it, and when you go further and cut off what little is left you will find that by-and-bye you will wipe it out of existence entirely.

DAIRY FARMING IN CANADA.

Prof. Robertson, was again introduced, and said: I am to speak upon dairy farming in Canada. Ours is a big country and I have a large subject, with a short time to discuss it. I had either the good fortune or the misfortune to be called upon unexpectedly yesterday afternoon to say something to those then assembled in the Town Hall. I said some things which I had meant to save up until this session; but with my usual Scotch generosity I gave the best of them away then.

However, this morning I would like to bring some of these before you again, and dress them in a new garb, so that those who were not there may have the benefit of them, and that they may appear to some who were there in a new light.

I am glad to see here this morning cheesemakers, and I do not think cheesemakers should be satisfied if most of the time is given to the details of cheesemaking practices. A man who contents himself with knowing only the nature of the one circle in which he operates, will never have a widely extended influence in the community where he resides. So, I think cheesemakers should come to these conventions in order to be informed of the broader aspects of the questions that concern them, so that they may go back and stimulate the farmers in such a way that they may become the leaders in agricultural thought, and not merely the makers of the products.

Then, I am glad to have patrons here, because, when the farmers who furnish milk to cheese factories hear the discussions, they begin to discover that a cheesemaker follows a task of unusual difficulty, and then they will be willing to make allowances for some of his mistakes. Because while proper enough and necessary that the cheesemaker should be required to make good all loss on inferior cheese—(just as an obligation upon him to do his best)—I still think that no cheesemaker is able to make equally fine cheese every day of the year from the milk he receives every day of the year; and when they recognise that cheesemaker's sometimes do their best and fail to make the best cheese, because of different influences, then the farmers will not bind cheesemakers to pay for all inferior cheese; but only for such as result from carelessness or incompetency on the part of the cheesemaker himself.

And then, the cheese buyers who are here can be both useful to the convention and the industry, and receive some points themselves by coming to such gatherings as this. The men who sell the cheese do not know what the foreign markets require, and we

expect the buyers to give them information. Mr. Ballantyne asked me to impress the fact that the English buyers and consumers will have solid cheese, and let one look ever so symmetrical outside, if it be porous inside, the price will be cut down from one to two cents a pound.

I will have something to say, perhaps by-and-bye, to each of those classes of dairymen before me ; but, I will speak meanwhile of the broad lines of policy in dairy farming, for the benefit of those who may study this report during the coming summer, and shape their course according to its recommendations, as well as for the pleasure of those of you who pack the hall so densely to-day.

First of all, I want to say in this connection that the very name "dairyman" and the name "dairying" have created in the minds of most farmers an erroneous conception as to the meaning of the calling that they themselves follow. If you speak of a dairyman, at once some one says, that is some one who milks cows and handles cows, and knows nothing else except about cows. Dairying has a wider signification than that and should comprise within its range everything from the tilling of the soil, up to the marketing of the finished concentrated products. As soon as dairymen begin to inform themselves in all the aspects of this wide-reaching calling which they follow, they will be able to do their work far better.

Now, the object of dairying is like the object of all farming—to find food for the people and preserve fertility in the soil, and give employment to a large number of people. Just as dairymen recognise the force and place of each of these three uses of their business will they be successful—food, fertility and employment.

When a dairyman does not know that his efforts are directed to making food, he will keep cows that give 3,000 pounds of milk a year, because he thinks it does not pay to get more. He will say, "I want to get the price of cheese up to 20 cents per pound," instead, of saying, "I want to get 6,000 pounds of milk per cow at no more cost than the 3,000 used to entail." Now, the tendency of all effort is to cheapen the cost of production, and the man who furnishes from his own barn the largest supply of food for the people, has the greatest chance for getting a big profit ; because it is better to have cheese selling at 8 cents per pound, from a 6,000 pound cow, than to have a 3,000 pound cow and obtain 12 cents a pound. Other dairymen are learning to produce cheaper, and the force of keen competition will leave profits only to those who produce cheapest. So every cheesemaker should try and have his factory a centre of agricultural education, in a district whence the people will send out the largest supply of food per acre, from their neighborhood ; and in doing that they will be able to maintain the fertility of their soil.

Now, dairy farming must be the main industry in Ontario, and I think will be the main industry of the whole Dominion in coming years, because no sort of agriculture will elevate the people and enable them to carry on the work in this threefold way quite so successfully.

Then under this first head let me say a few things. The demand of consumers to-day around the whole world is for foods of a more concentrated quality and value. A long while ago people lived mainly on bulky and cheap food, but now-a-days the residents of the great centres of population insist upon having concentrated foods of fine quality. They eat more meat and butter and refined articles of diet. That means, you see, that the dairyman has an advantage, because he sells refined articles carrying the largest value per pound at their weight. A man sells a ton of cheese at 8 cents per pound, that is $160; and a man sells a ton of hay at $8. He has sold a ton of material from his place in both cases, and in one case he has been able to load on his ton of material, labor and skill only bringing $8. In the other case he loaded on his ton of material, labor and skill carrying back $160. Now, if a man gets $160 against $8, how much more chance there is for that man to have a profit. I will run the risk any time of getting a margin of profit out of a large sum like $160, rather than if I had only a small sum like $8 a ton.

Then, in the question of fertility, it becomes even more essential that the farmers of this country should protect their soil. The land which we farm once had in itself a good deal more strength to sustain plants than it has now. Most farms have become weak ; that is their productive potency has been exhausted, and they are like a man who has been passing through a long stage of wasting illness ; when he recovers he is weak.

He may measure as much in girth, but he is weak and cannot do much until he regains his strength. When people persist in cropping land year after year the fields measure no less than they would measure before, but the energy, the vim, the power is gone. They need a course of treatment to bring back the strength to the soil. Now, dairy farming will do that. For myself I have no sympathy with the people who are all the while running our country down, and proclaming that this land of ours is not the equal in any sense of any land on this continent. (Applause.) I have small sympathy with the man who says that the fertile fields of Oxford and adjacent counties will not grow as large crops as has been grown anywhere in America. The soil will grow larger crops than elsewhere, when the soil gets a fair chance, but we should not sell large quantities of grain from our farms, because it takes out of the soil its strength without putting it back again. I think Prof. Roberts made a calculation like this that with fifty years farming by a rotation of crops a farmer would take more out of his land per acre of the substances that go to furnish plant food than he could buy in any part of the world to-day for $400. We did grow, a great many years ago, large crops when grain farming, when we were taking out of the soil fertility which had been accumulating for centuries and ages and cycles before us. But a large bank account will not stand repeated checkings by a profligate liver who does not make any deposits.

Then, in the matter of employment, I find that wherever men follow dairying most intensely, there a larger number live on the farms. You may put it down this way, that a man who will keep twenty-five cows and some young cattle on each hundred acres of land, will require more help the year round than a man who keeps a fewer number. He will give profitable employment to more men, and in that way he makes the whole community more prosperous.

Dairy farming will give a larger supply of food per acre by making available many crops which man cannot otherwise use. Man cannot live on grass, but if he will keep cows he can find a larger means of support for himself and a large number of others. The corn crop is just grass. Sixteen tons of corn is a large yield to the acre, but if he have enough sense to put a cow between himself and a corn stalk there he will get a yield per acre to feed four cows during the winter.

Then, since I am to speak on dairy farming in Canada, it may be as well to introduce here a few remarks as to the status of the industry in the Dominion. For the people who are themselves engaged in dairying here, it may not be of so much interest to tell what they are doing in the other Provinces, but still to show you how people are doing elsewhere, that you may even adopt some of their better practices, may not be a misspent quarter of an hour. Now, from this map of the Dominion of Canada I would like to show you what they are doing in Ontario. We have in this western peninsula a county called Oxford, and in it a place called Woodstock—a little place close by Ingersoll. (Laughter.) In Woodstock neighborhood men follow dairy farming, mainly in the making of cheese, and they supply their milk to factories which run about six months and one or two weeks in the year. And then the farmers go on feeding their cows the other five months and two or three weeks, and find almost no income from them for that period. So that Oxford, which once had the reputation of being first, is no longer first in regard to reputation, because the farmers are not making milk all the year around. Perhaps the reason is that they are exceedingly modest and may think shame of being always in the front, and so have stepped back to give the other fellows a chance. (Laughter.) Now, in this part of Ontario we formerly had the reputation of making cheese of the best keeping quality, but the people of eastern Ontario were not slow to learn that, and to adopt all the good practices they could transport, and whereas the eastern factories used to receive about a half cent a pound less than factories in the west, you will now find they sell rather above the average prices here. I can find you some factories in the eastern part of Canada and of Ontario, whose average price this last summer was 9½ cents. I don't say your cheese is not as fine, but you are not now half a cent a pound ahead of them, as you used to be a few years ago.

Then, down in the province of Quebec the habitans used to make cheese that sold for 2 cents a pound less than the west, and now I could name you factories all through the province of Quebec where the make is just as nice in quality and shape as any cheese

made here, and it is going into the London, Liverpool and Bristol markets, and winning a reputation for them, because the people have not been slow to take their ideas from the west and put them into practice. With all the reproaches sometimes applied to our French fellow citizens I do not find them trying, as Mr. Adams said last night, to put their feet down just where their fathers were, but they are putting them down where they will get the most fruit from their efforts, and the more you know of these people the more wholesome respect you will have for them.

I went away up the beautiful and weird Saguenay River, where there are French speaking people only, and where I went to see what sort of farmers we have living there. They are isolated and could not speak a word of English. There are about 30 cheese factories in these two counties, and I found when I went there to give one day's lessons in the art of cheese-making that one of these men who are called "slow," "lacking in enterprise," drove 60 miles over hard roads to get one lesson, and I learned afterwards that the cheese from his factory down there sold for just one cent a pound above that of the factories around him that had not got the new methods into practice, and just as high as Ontario's. He is taking in two or three young men this year to teach them how to make cheese. The Quebec provincial government has recenty made provision for paying half the salaries of not less than fifteen travelling inspectors and instructors this season. So they are not going to be so far behind. Every pound of fine cheese made there lessens the drug of inferior cheese on the market.

Then, away at the coast of Gaspé and Bonaventure I found men making capital butter, and I found that they are keeping their outbuildings as immaculately clean as they do their houses. We find sometimes in the west, you know, stables not very much to the credit of people who have been dairying so long.

Down in New Brunswick I found cheese factories and some creameries, and the people clamoring for information on every hand to aid in the development of this business. They are just awaiting the advent of some enterprising man to establish cheese factories and make that part of the country receive the advantages of a prosperous cheese factory trade.

In Nova Scotia, a land that is in some parts rough, in others most beautifully fertile, I found the "Blue-noses" most anxious to get cheese factories, and in the Antigonish valley found eight factories in operation, and more are being established every year. Down there I found that cheese factories, on the whole, are kept cleaner in their surroundings than in some older districts where the people ought to have learned the needs of their business by long observation. Sometimes in the west you can tell when you are approaching a cheese factory when it is very far off. Like the war-horse, you can smell the coming events afar off. (Laughter). It is not a good thing to have such influences vitiating the atmosphere.

I spoke of Prince Edward Island a little last night. It is the gem of our Dominion as a grass growing country and the people are anxious to have dairying. Then, across in Manitoba they are starting creameries, and across the Northwest the farmers mostly go in for stock and some dairying, and in the Calgary region they go in for dairying. They have good pasturage and good water. Then, away across the Rocky mountains, and here I think I could give you ten minutes talk and some exhortation which would stimulate you to patriotism in thinking of that beautiful part of Canada, rich in all kinds of resources that bring wealth. Out in British Columbia and Vancouver Island the people are beginning to follow dairy farming with more profit. So, from the Atlantic to the Pacific we have the best conditions that prevail anywhere for keeping cattle in good health, for growing crops, and we have excellent facilities for transportation in the west towards the high priced markets of China and Japan. We have, on the whole, just a capital country for developing dairy farming, and by making that our specialty will make agriculture profitable in the whole Dominion.

Now, just a few words as to the way we can improve this business in our own locality. I have hinted at the way in which the food supply on our farms would be increased by giving an extra value to all that is sold and by selling everything from our farms in the most concentrated state Let me give you one illustration: People in buying food are after strength, nourishment. That is served up to them in some material. Every food we have as a rule has nitrogen, phosphoric acid and potash,

and a small quantity of those things carry nourishment of some kind. Now, when a farmer puts manure on the land he puts some of these things on the land to feed the plants. A ton of that manure will cost him $2.50. A man by putting these same three things into his soil, through the laboratory of nature under his supervision, through his plant and from his animal can get the same three things; the same things so glorified and so refined that the $2.50 worth of material will sell for $25.00 in butter. So a man, you see, by dairy farming need not exhaust nature and can bring out a glorified substance carrying lots of value because of lots of *man* being laden into it. You cannot sell anything dear to-day that I know of except a man. You cannot sell a horse that has no man quality in it for more than $15, but if a man will breed a horse and break and feed it right he can be sell it for as much as he has laden in it. You cannot sell butter that has no man quality in it for more than 3 cents a pound for axle grease; but if you will load a man into it—a man's skill—you will make butter carrying a value of 25 cents a pound for the winter. Now, every man who has anything to offer to the world can get paid according to the quality of the man he offers the world, and as a man qualifies himself for doing the work of the world he can load his work with a high quality of man and get a good price, because the world is hungry for the brain products of good men.

Then I have already said that the tendency of our business is to produce all sorts of dairy products at the least cost, and that is necessary because all the trend of all markets is downwards. Then we need to have cheaper production to ensure prosperity, and we need to have it to fortify us against those low markets that are likely to get still lower. By doing that we will have a permanency that will not fluctuate. One illustration: If a man will learn to produce milk at 5 cents a gallon or 50 cents a hundred pounds—and any man can do it by putting himself to the task, with good judgment—then if the cheese sell next summer for 10 cents per lb. he will get his 3 cents of profit. Well now, if the following year if the cheese goes down to 60 cents a hundred for his milk, he still has one cent a gallon. But if he does not apply to his business a lessened cost of production when the low year comes, his profits disappear. Now, reduction in cost of production will always give permanency to profits; a large profit in a good year and some profit in a poor year.

Now, how can we make this business more profitable in reducing the cost of production? First of all by getting a clear conception of we what keep cows for. We need this first of all: a clear conception of what we are trying to do. I find this in my observation of men as well as in my own experience, that even in digging a ditch or doing the simplest of manual tasks, a man who is fortified with a clear judgment and conception of what he is trying to do is better furnished for that work than a man whose muscles only are strong and whose hands are hard. A man with a weak body who knows how to apply his strength in every case, sees what he wants to do and will do more of this work than a man who has a strong body only. A dairyman who has a proper conception of his business will see that he keeps his cow for profit, and profit always lies between the cost of production and the price of the product. A man cannot afford to keep a cow all the year round that only works a short part of the year. It won't pay to keep a cow boarding-house and not get full pay from the boarders. Still lots of farmers never think of the pay for the board. They try just to have a lot of cows, and then never look to see whether they get as much back from the cows as they give to them. Very often a cow eats more than she gives back. You never find a man who keeps a lot of boarders saying, "If I can get $20 from the lot, although one man does not pay for his share, I will let that slide." No, he wants to know whether every boarder pays his own account for his own board. If any man does not the proprietor says, "Well now, it might be more convenient for you to board with somebody else." I would rather have an empty stall in my stable any day than a cow, unless she paid for what she ate. Then it is good to have a cow pay for her board systematically. I think I once used an illustration to the effect that it was a good thing to get cows into the habit of making weekly offerings. A few years ago it was hard to get the minister's stipends paid. Then some man with good business sense thought it would be a good thing to have the people of the congregations all make a weekly offering; and it

seems a good deal easier to pay a dollar a week for the support of a church than haul out $50 all at once. If you get a weekly offering all the year round from the cows they pay better. We have eight native Canadian cows on the educational list of the Central Experimental Farm from the province of Quebec. They are being educated this winter to milk three months longer, and though they do not give enough to pay for milking them now, I am educating them for next year. It pays to feed succulent food when cows are dry, so as to encourage the activities of the milking functions. If a cow lives with a man for a long time and never pays for the food she eats, the cow becomes a discouraged debtor, the man gets discouraged too, and there is sure to be disaster.

Now, in the matter of cows, it will pay a man to make sure of what he is after. First of all I would be after milk, then after milk I would be after calves to rear and fatten. Then after that I would be after beef, and if I got this I would have so much to the good. But I would never look for beef first and then after that for milk and calves.

A cow should have five points of excellence: a long udder; a soft skin, mellow and moveable; a large barrel, with broad ribs wide apart; broad lions and long rumps; and a rather long neck, with a fine cut face. These five points will almost always reveal to you a cow that ought to pay her board. It is a good plan to enlarge her capacity by breeding in a line of her own purpose. I know one man who by breeding in that way from 10, two-year-olds, 10 three-year-olds and 10 four-year-olds, got forty-six dollars and some odd cents per head from the cheese factory during the season of six and a half months. He was breeding in a straight line to get milk and then calves and then beef. I would not cross the line of continuity of my cows that would shunt their progeny on to another line that did not mean milk and calves and beef.

I would grow the best food. In this country the corn plant is at the top by far. It is freer from disease and hardier than any plant we grow. Then in growth it is best to have the stalks fairly wide, about so as to get dark coloured leaves. The plant has a function of appropriating from the atmosphere carbon, and by taking 160 corn stalks and weighing all the leaves and stalks and nubbins I found that nearly one-half of all the food value was in the leaves, one-quarter in the stalks and the other quarter in the nubbins. It is best to have these big leaves, and to let the plant just reach that stage of growth when the grain on its cobs are in the doughy state. It seems to keep best when cut then, and the plants have also the largest amount of nutrition in the easiest form to obtain.

I need not speak of the silo, because the people around Woodstock will have silos on their farms some time before twenty-five years, and I will have lots of opportunities to talk to them between now and then. (Laughter.) In other places they have silos now. They find corn ensilage keeps the cow in a healthy constitution and gives a large flow of milk. I have not heard of a single silo this year that has failed in any part of Ontario. If any of you want information on this subject I will take your names, or you may send me letters free, and I will send you a bulletin as to the growing of corn, the construction of a silo and the filling of it.

Then it is possible to augment the profit by reducing the cost of labor per dollar's worth of products sold from the farms. If a man looks after ten cows, it would not cost much more to look after twenty-five cows. As I said yesterday, I think a farmer should make it his aim to have twenty-five cows for every hundred acres. Twenty-five head of cattle would be furnished all the fodder they required all winter from, at the very most, six acres of corn put in the silo. With that number of animals he can easily furnish manure and grow more crops. The proposal may be met with this objection :—"Where can we get the cows? We cannot go north any more and buy cows." I am glad of that, because it shows that the people in the north recognise the value of their own cows. But if the cows were calving in the winter time the farmers could raise more calves of excellent constitutions. One of the reproaches that has attached to the cheese factory business is the epithet "cheese factory calves," and when a man who does not furnish milk to a cheese factory has made that charge against a farmer's stock he thinks he has annihilated the whole business. Well now, "a cheese factory calf" may be just as good and large and healthy and serviceable as the calf of a farmer in any other business, if the

owner of the calf will only raise his calves in winter and furnish milk to the cheese factory the following summer. Then, in saying that we say nothing that will be opposed to the further extension of our cheese factory system. It seems to me that this winter dairying is an essential complement to cheese making in the summer time. It will give us more stock, and it will give us a larger income. We are circumstanced with advantage so as to make cheese all summer and butter all winter. We can make butter to advantage in the winter, because in England there is an unlimited demand, and our cold winter offers the best advantages for making fine butter, and for keeping it, either in storage or transportation. And then we will be able to raise fine stock and remove the growing hostility between the live stock men and the dairymen, because this system will become the means of furnishing cattle for export to England.

Now, we send to England about 34 per cent. of all the cheese she imports from abroad. We send a little over 25 per cent. of all the live cattle she imports from abroad. We send only 2½ per cent. of all the butter she buys from abroad, and usually she purchases abroad two pounds sterling worth of butter for every one she imports in cheese. There is a butter market there, you see, awaiting our supply in the kind of supply they need. The Danes send excellent butter and get about 26 cents per pound in winter, and I have sent Canadian butter, fresh made creamery, which was so much appreciated that for three years since I have had letters asking for more. They liked it, said they had never had better, and if I had more like it they were ready to pay the highest Danish price for it.

Now, after reducing the cost of production in the cost of food and by prolonging the earning season of our dairy herds, we need to improve the quality of both the cheese and butter that are the products of our makers' skill. It would not be wise to enter upon a discussion of all the changes that are desirable towards that end, but among those subjects is this, that cheesemakers need more information and that they can obtain only I think through the establishment of experimental dairy stations and the work and instruction of instructors. They need, not only instruction, but supervision. It is given but to few men to do their best, day after day and week after week, without some outside supervision. The work of an instructor is mainly valuable, when the instructor goes around in a sort of a genial way, and when the maker expects some one around to see that he is doing the best he can. Then it is a good thing to have the patrons in an expectant mood concerning the visit of some stranger whom they would like to please, and they will receive him most cordially by letting him know how good is the quality of milk their cows produce. When they expect the arrival of a distinguished individual, you know how ambitious the patrons will be to furnish good milk just for the sake of his approval. Now, for myself, I would not like to have those men who do not send the best of milk to the cheese factory paraded before the public often. It would not be good or kind; but their expectation of the visits of this official inspector would be helpful. The plan would be to have one man who might be expected to drop down in any part of this province, and being under no supervision except that of some central authority, the farmers would learn but little except by his movements. He could discover the men who were sending all good milk to the factory, and if he found a man who was not sending good milk he might help him a little by bringing to the assistance of his defective moral judgment and practice the operation of the Act on milk adulteration. One lesson or two to a few would help a great many. Then I would have some man go around among farmers who were suspected of adulteration, and if he prosecuted four of the worst ones he could find, and advertised the fact of their prosecution and conviction, by putting out small dodgers and sent these out, say dropping them in the milk cans, it would be rather a wholesome piece of information.

Then cheesemakers should be induced to do their work in the very best way right to the end. The great weakness in most of our dairymen and other citizens, is that they fail in perseverance unto the end and quit when two-thirds of the way through. A cheesemaker makes the best cheese he can at the beginning of the season, but after a time there are pic-nics in the neighborhood and he does not do quite so well. Then he gets gassy curds, and he "does not believe in sitting up all night" and he makes soft, open cheese

and the buyers do not want these. You will find all through life that those men only do the best who persevere unto the end ; and a man who does that in any sphere will compel success every time.

Let me conclude by saying this, that all around the world people are getting more fastidious because they are better off. In our country we are all better off than formerly, so far as I can learn. People wear better clothes, live in better houses, are more cultured in their tastes. They won't eat butter and cheese of the quality of ten years ago, and when they are more fastidious they will pay a better price for a better article. If men in present circles find this the case in marketing, there will be more difference in years to come, and since quality cannot be changed in one day it will be an ill day if we let out of existence all those agencies and factors such as inspectors and instructors who have done so much to give a better quality to our products. I think they ought to be commended and improved and enlarged in every aspect of their application. In that way I think that dairy farming in the whole Dominion can be made more profitable and will leave more profit. I have spoken of other provinces. Their success is your success, because if they make finer goods and more profits, the whole nation responds to the individual prosperity. In that way, I think, by improving the practices of dairy farming, putting into it more enthusiasm, we will make our nation what it ought to be—a nation of skilful, prosperous dairy farmers from the Atlantic sea to the Pacific coast. (Applause).

THE COST OF KEEPING A COW.

Hon. H. C. Adams read the following paper :

The cost of keeping a cow depends : 1st. On the cow. 2nd. On the man who keeps her.

A cow is not necessarily a cow ; she may be a hog, or worse yet, a dyspeptic. In any case she is a machine of greater or less power to make fodders and grains into butter, cheese and calves. She does not necessarily produce results in direct proportion to rations. In other words, 50 lb. of oats fed to one cow may make 10 lb. of butter ; fed to another cow it may make 4 lb. of butter.

Capacity to turn out butter from grass is a thing of development running along the line of heredity and stamped in breeds. Capacity to simply consume has not been bred for as a result, but will crop out occasionally among thoroughbreds, but more frequently among natives and common stock. A cow cannot "eat her head off," as the saying is, no matter how much she consumes, if she is of the right kind. By the right kind I mean a cow which makes milk, cream and butter out of surplus food. A cow which becomes more profitable as the expense of feeding her increases is the one which has the golden calf.

The smart American dairyman of to-day is not only wiggling away at the old problem of making two blades of grass grow where one grew before, but he is trying to make one cow eat what two ate before and give twice as much milk as two did before. This is done to reduce the ratio which the cost of keeping a cow bears to her gross product.

The Jersey cow "Nancy Lee," has made 4 lb. 2½ oz. of butter in one day and 95 lb. 3½ oz, in 31 days, four months after calving on ordinary food. There are a great many cows fighting flies in this country and kicking over milk pails that would not make as much butter in a year as "Nancy Lee" did in a month. They cannot help it ; their mothers and fathers and ancestors from away back where history dissolves in fiction were not trained up in the butter business.

G. W. Farlee, of New Jersey, in a statement of a year test of the Jersey cow "Signoretta" 21546, makes a clear demonstration of the importance of the individual blood and make-up of a cow to this question of keeping her. The test was made on her second calf, beginning Sept. 20, 1886, and ending Sept. 19, 1887. Although only three years old she gave during this period 7,621 lb. of milk, from which was made 680 lb. 6½ oz.

of butter. At one period during the test her milk showed 60 per cent. of cream—this was when the first flow of milk had shrunken one-half. Her daily grain ration averaged 8 lb. Certainly there was no forcing process here. The cost of keeping that cow long enough to make a pound of butter was light because her ancestry had practiced the art of making butter until it had become established as a hereditary quality.

W. R. Mowray, of Oxford, N. J., published some time ago his experience with a dairy during a term of 12 years. It illustrates forcibly how the breed may save the feed. He says: "The first three years the cows were natives; in 1878 there were 3 grade Jersey heifers three years old; in 1879 there were three natives; 3 three-year-old grade Jerseys and 7 two-year-old grade Jerseys; in 1880 they were all grade Jerseys; in 1883 there were two pure bred Jerseys part of the season; in 1884 there were 3; in 1885 there were 5 pure bred Jerseys, but feed was short and I was overstocked; in 1886 about half were pure bred and half grades.

The following statement gives the average yield of butter per cow for the herd during each of the years in the period named:

Average lb. of butter per cow in			1875	125 lb.
"	"	"	1876	159 "
"	"	"	1877	153 "
"	"	"	1878	155 "
"	"	"	1879	145 "
"	"	"	1880	187 "
"	"	"	1881	195 "
"	"	"	1882	207 "
"	"	"	1883	244 "
"	"	"	1884	250 "
"	"	"	1885	240 "
"	"	"	1886	276 "

We have average production here changed from 125 lb. per year to 276 lb. per year by the saving grace of good blood. A gain of almost 100 per cent. or a reduction in the cost of butter by more than that percentage. The tail cannot be bred off a monkey in a minute, and the butter cannot be bred into a steer masquerading in a cow skin in a generation. Every cow has her individual limit of butter production fixed at birth in her physical and nervous constitution, just as a child carries in its infant brain the limitations of its matured intellectual power. If that limit is low she is a costly cow, not in spite of fate but because of it The man who undertakes to lift a mortgage with her is on the wrong end of the teeter, and will get lifted himself if he breeds to her kind. A corn planter is an expensive tool to dig potatoes with. A poor cow is just as expensive a machine for making butter fat out of feed. She was made for some purpose not yet discovered.

Next to the cow in the economy of feeding stands the feed. It looms up so prominently before many men that they cannot see the cow at all. They have a notion that the cow in her milk production is as flexible as the elements. Along with the battered old statement that "money makes the mare go," they ring in its companion piece "corn makes the cow go," and it does, it makes her go dry a great many times when she might be going in the "milking-way." The cow we are talking about is a dairy cow. A percentage of the food taken by every cow is undigested or not assimilated; the percentage of loss sometimes runs as low as ten, sometimes as high as sixty per cent. It is not the animal which eats the most, but the one which assimilates the greatest percentage of food consumed which is most profitable.

A cow is fed for four purposes, to repair the natural waste of her body, to keep her warm, to sustain the embryonic life which she carries, and to make milk. These purposes demand two kinds of food, the heat making and the flesh and bone forming. To understand the proper ratio in which these foods should be mixed in a complete ratio has been the object of exhaustive scientific research. The result may be stated in a general way as requiring one part of the albuminoids, or flesh forming elements, to five parts of the carbohydrates, or heat producing elements. Food so proportioned is fed with the least loss under average conditions. A cow cannot be fed cheaply upon bran alone, or hay alone, or cornstalks alone, or cornmeal or clover, for the one reason if there were no-

others, that in themselves they do not furnish food elements in the proportion required. Straw, barley, cornmeal, corn fodder and ensilage make heat and fat. Bran, middlings, oilmeal, cotton seed meal, malt sprouts and oats have a much greater proportion of flesh and bone material. The art of cheap feeding consists in combining these or other foods in right proportion, and selecting such as can be obtained at the least cost. The comparative cheapness of a ton of a given feed cannot be determined by the price of it. Under certain circumstances oilmeal at $30 per ton is cheaper than cornmeal at $15 per ton, because oilmeal contains three times the digestible flesh forming material found in cornmeal, and one pound of it will go as far in restoring a ration poor in albuminoids to its proper composition as three pounds of cornmeal. Straw is almost worthless fed with corn or ensilage; fed with timothy hay and oilmeal it is quite a valuable feed. This matter of economic feeding has been forced upon the attention of dairymen by the necessities of the times. With a gradual yet constant shrinking of prices has come a vigorous and effective effort to lower the cost of production.

If nothing can be done to raise prices something can be done to reduce expenses. Thought and knowledge are as valuable applied to questions of cost as to questions of price. The manufacturer brings all knowledge within his reach to bear upon the matter of economical production in even the minutest details of his business. The farmer has been studying his methods. The agricultural press is filled with enquiries about the digestibility, or the chemical analysis, or the feeding value of this or that food. Prof. E. W. Stewart, in a reply to an Iowa correspondent, recently gave the following as a good daily ration for a large cow: 18 lb. timothy, 8 lb. oats, corn and cob, 6 lb. roller bran, 3 lb. oilmeal.

With hay at $10 per ton, corn and oatmeal at $18, bran at $14, and oilmeal at $25, we would have a daily ration costing: for hay 8 cents, corn and oatmeal 8 cents, bran 4 cents, oilmeal 4¼ cents, making a total of 27 cents. The prices given are lower than at present, but they are just now abnormally high. Upon the Wisconsin basis of average prices, which has been assumed, the "big cow" would be an expensive creature. She is provided in this ration with 17 lb. per day of grain feed, 12 lb. per day of grain properly fed is sufficient for the ordinary Wisconsin cow; this would reduce the daily expense to 22 cents. A much cheaper ration, which would be approximately correct in its nutritive ration, can be made with—

10 lb. fodder corn, costing		2 cents.
10 " hay,	"	5 "
5 " bran,	"	3½ "
5 " middlings,	"	4¾ "
2 " cornmeal,	"	2 "
Total		17¼ "

or $31.05 for the 180 days of the year which constitutes the feeding period. Pasturage can ordinarily be obtained for the balance of the year for $10, which would make the cost of feeding the cow for a year if everything was purchased, $41.05. Advocates of ensilage claim that 50 lb. of ensilage per day, and 10 lb. less of bran, will give a cow all she needs. Various estimates are given as to the cost of ensilage. It undoubtedly costs $1.50 per ton in the silo, 50 lb. would then cost 3¾ cents; 10 lb. bran, 7 cents; total, 10¾ cents. At this rate the winter feed of a cow would only cost its owner $19.40, and the total annual expense would be $29.40.

One point must not be overlooked in the question of economic feeding. Rations must be varied at times to give zest to animal appetites. A costly food highly relished is sometimes cheaper than a low priced food of which the animal has become tired. A cow is like a human being she likes and needs variety in her diet.

The perfection of the digestive and assimilative process are more dependent upon appetite and taste than is generally supposed.

The grass of the early pasture produces more per 100 lbs. of actual nutrient material than any other feed known. No other food is so relished by a cow. Cows will often leave good clover hay to eat some old rotten straw, and the hired man comes along and wonders what the old fool is thinking of. She is in the same fix as the Democrats were a few years ago in Wisconsin, and the Republicans are now. She wants a

change. It is not necessary to give her muffles for breakfast and Saratoga chips for dinner, but give her a change of grain ration every month. All grains to be fed most economically should be fed dry. We only except malt sprouts; they have a swelling power, only equalled by an American imitation of an English snob. They throw dried apples completely in the shade. They should be wet with three times their bulk of water or skim-milk. Dry feeding means more complete mixture of saliva with the food, as it is necessarily eaten slowly. Grain should be fed upon cut fodder or fine hay. It thus becomes a part of the cow's "cud," to use a common expression, and is re-masticated with the coarse feed. Only in this way can anything like thorough digestion of grain be obtained. When grain is fed singly in large rations to any animal, it passes rapidly through the digestive tract and appears in considerable quantities in the excreta unchanged. Prof. E. W. Stewart estimates this loss to be from 30 to 50 per cent. of the value of the grain so fed. It is a matter which materially affects the cost of keeping a cow. Another feature of the case is that the vitality of the cow is weakened by her imperfect digestion. The cost of keeping a cow is also dependent upon the kind of water she drinks and its temperature. Impure water in summer and cold water in winter does not pay, they cost too much. In the first case, the health of the cow is affected, and in the second, it costs more to warm the water inside the cow than it does outside, for the very plain reason that cord-wood is cheaper than corn-meal.

In a dairy of 20 cows the water can be warmed to a temperature to 80 or 90 degrees during the coldest weather of winter at a cost for fuel of $1 per cow. Experiments at the Missouri Agricultural College show that warm water saved them 10 per cent. of the feed. If feed cost $30 for the winter there is a saving of $3 for each cow. This is in a state where the charms of a Wisconsin or Canada winter are unknown. The general testimony of men who warm the water for cows, is that it increases the milk flow upon the same feed from 10 to 25 per cent. No improvement over the old system of dairying is more marked or certain than this. It has been urged that it is contrary to nature to warm water for a cow, that we are making her an artificial creation, that she is losing the hardiness of the beautiful rainbow-backed creature of the olden time, who simply "humped herself" to meet the exigencies of the weather. Of course, she is an artificial creation, and the more artificial she is, the better we like her, and the more she is worth.

Men have done a pretty good job with awfully raw material they found in the primeval cow. They have bred off the surplus bone and the surplus flesh and unnecessary hair, and the tail like a fence post, and the horn like an elephant's tusk, and the empty head that adorned the old native, and given us a cow that has brains and beauty, and can give us milk. Cows in a state of nature were milked by calves.

The men who are worried because cows are being twisted from their original bent should let the calves have a show.

Cows can be made hardy, there is no doubt about it, but it costs too much. The hardiest cow I ever saw was frozen stiff on the chilly side of a fence in December. She had risen in the scale from comparative hardy to positive hard. One thing more about feeding—except where land is cheap and labor high, soiling will diminish very materialy the debt side of the cow account. During the last season I fed 24 cows 18 days upon southern ensilage corn fodder grown upon one acre of ground. The feed would have carried one cow 432 days, or one year, two months and seven days. The cost of raising the acre of fodder corn was as follows:

Plowing	$1 25
Planting	50
Seed	50
Harrowing	1 50
Cultivating	1 50
Cutting and feeding	4 00
Total	$9 25

This is a cost per day per cow of less than 2½ cents. Prof. Henry in his annua report for 1885 gives details of an experiment showing comparative results of soiling and pasturage. From tables given, we find that one acre of pasture gave 1,779 lb. milk

which made 82 lb. butter; one acre of soiling gave 4,782 lb. of milk which made 196 lb. of butter. The acre of pasture made $20.50 worth of butter; the acre of soiling made $49 worth of butter. It cost 2½ times as much to let the cow get her own feed as it did to carry it to her. It is but fair to state that in this account the cost of handling the soiling crop has not been computed. It is reasonably certain that the old-fashion pasture will be too expensive a luxury for the next generation. Finally, with the cow bred for her business and the feed adapted to the cow, we need a man competent to handle both.

With incompetence, we have wasteful feeding, careless housing, rough treatment, and irregular habits, all active enemies of economy in the dairy.

The incompetence is usually the results of thoughtlessness, rather than absolute incapacity. When a farmer begins to think in earnest he runs rapidly to correct conclusions; but the trouble often is, that it seems to make him tired to even think of thinking, when perhaps ten minutes of thought would save him ten hours' work. A man who will not think, and think hard, has no business with a cow. She will beat him every time. She is as susceptible to intelligent and thoughtful treatment as an invalid is to changes in the weather. Make her warm and she will eat less, and give more and better milk; keep her clean and food is saved that would otherwise go to repair the nervous waste caused by discomfort; feed her regularly and we get that perfect digestion and assimilation of food never known in the hit and miss system. A good cow is well-bred; she despises rough ways and hard usage. She has no respect for the man who swears at her. She balances accounts with him by shutting down on his milk supply and raising the cost of his butter. She is not to be fooled with; she has dignity and self-respect. She is the product of brains and good nature—and it requires good nature and brains to manage her profitably.

Mr. Adams, commenting on one point in his paper, said: About the warming of water, with me it has been a very important matter. I recollect having 41 cows in one lot. The young man and myself who went into business together got into debt and had to do the best we could to dig out of it. We didn't get enough milk to satisfy us, and tried all sorts of means and manner of feeding, and my partner even used to get up at midnight to see if we could increase the yield by feeding at night: but we could not get more milk. In talking to an Englishman, he said to me, "I will tell you; go to warming the water the way they do over in England." I got a kettle that would hold 40 gallons and fixed up a place for the fire under it and we heated the water until it came to blood heat, and in it stirred bran and shorts. Well, it was just astonishing the way the cows increased their milk supply. I thought, perhaps, they would give more milk if I could get them to drink more water, and I began to put a little salt in the water to increase their thirst; but it reduced the quality of their milk, which was not the case when they got simply warm water mixed with a little bran. Our experimental station has tested and found only a slight increase by the use of warm water in the production of butter. That can be explained because the cattle have model quarters. The average farmer does not have any such surroundings, and he gets a much larger advantage, and I would say to every farmer who has a cow, if you want to increase the product give her warm water.

A Voice.—I have listened with great interest, and I trust some profit, to Prof. Robertson and the Hon. Mr. Adams. They have made some excellent points, as far as I can judge, which if put in practice will be very beneficial; but there is one thing I noticed in both of them, that the more "man" you can put into the work, the larger amount of benefit and profit you will get, both with regard to the making of cheese and the feeding of stock. It just occarred to me that our experts want some stimulating to bring about this end and that our best men are not paid as they ought to be. I would suggest that the cheesemakers form an association and fix a scale of prices, and shape things as they ought to be shaped. Things are so ground down in our day that men merely make their positions as cheesemakers a stepping stone to something else. The lowest price men get factories generally. The owners employ cheap hands and buy cheap materials, and these things are a great hindrance to the quality of our cheese.

The convention adjourned till 2 o'clock in the afternoon.

AFTERNOON SESSION.

On resuming, the question drawer was opened.

QUESTION DRAWER.

QUESTION.—What is the best method of removing taint from curd, or can taint be removed from the milk before manufactured?

Prof. ROBERTSON.—It is much easier to puzzle a man than to give him something easy to answer, and if I were answering that question straightforwardly, I would give *Punch's* advice about getting married. "Don't get into the trouble." But the only way to remove any volatile taint from milk is to have it aerated, that that taint may evaporate; and after that, the only way to cover up taint is to develop a large degree of lactic acid. So by the aeration of milk, and the development of acid in the milk, after it is partly dried, you can first remove part of the taint and then hide the rest.

A VOICE.—Can you remove the taint entirely?

Prof. ROBERTSON.—You cannot entirely remove any taint from milk. After all, in the matter of taints, *Punch's* advice is short and to the point—"Don't."

QUESTION.—Don't you think it would be a good idea for factory men to club together and get their dairy supplies from one man? Don't you think they could be got a great deal cheaper than they are at the present by so doing?

Prof. ROBERTSON—We will suppose that I am not a government servant and that I am in the dairy supply service. If I were in the dairy supply business I would try and get all the cheesemakers to club and buy from me. But as I have at least twenty good friends in the dairy supply business I am unable to recommend one of these as furnishing better goods or offering better prices than another. I don't believe in advocating combinations for the purpose of getting good supplies. If a man will insist on getting the best supplies, he will find competition now sufficient to put the price as low as it can be.

QUESTION—I should like Prof. Robertson's opinion on the extra heating of a gassy curd, say to 105 or 106 degrees, immediately before dipping?

Prof. ROBERTSON—I would not approve of that practice. I do not think a gassy curd should be heated above 100 degrees and should not be allowed to go below 94 degrees after the acid has developed. Extra heat makes a curd rather corky. That is the effect of gassy curds, anyway, so you see you add to the evil by increasing the heat above 100 degrees.

A VOICE—At what heat would you have the water when you wash the curd?

Prof. ROBERTSON—I would put it in the water at about 100 degrees. I would never put the water directly on the curd, but on a cloth over the curd.

Mr. THOS. DILLON—I would like to know the effect on cheese of taking hogs to the station one day and cheese in the same waggon box perhaps the next day? A great many farmers in the fall of the year will get up on the boxes and walk with dirty boots, and by the time they get on their load the figures on the boxes which show the cheese are completely covered with dirt. It must have an injurious effect. I find people taking in turnips one day and cheese to the market the next day, without anything to protect the boxes from the dirt from their fields which has been shaken off their turnips.

Prof. ROBERTSON—The wrong practice mentioned by Mr. Dillon is one that does the trade a good deal of harm. It is easier to point out a bad practice than to suggest a remedy; but I think a cheesemaker's duty is to stand between the man who produces the milk and take supervision of the goods he has made up until they are put on board the cars or in the warehouse. If a patron came to a factory under my care with such a foul box as has been described, he might go home with his box and another should take his place, and he should be charged with the drawing of that cheese. The value of the suggestion is here, that the appearance has so much to do with the price that no cheesemaker should allow his reputation to be damaged by having anything done that will lessen the value of the goods.

WORDS OF WELCOME.

Mayor DOUGLAS, of Woodstock, was then introduced, and said : On behalf of the town council of Woodstock, I appear to extend to you a hearty and cordial welcome to the town of Woodstock. It gives me great pleasure to see that the interest in dairying manifested by the meeting held in Woodstock some years ago not only still exists, but has grown to a greater extent than previously. We in Woodstock are always glad to welcome to our town associations which are working for the common weal ; but more especially are we glad to welcome to our midst an association like this, which has placed itself in the front ranks of those that are working for the advancement of one of the most important interests of Canada. I desire just here, on behalf of our town, to also specially extend a welcome to the Hon. Mr. Dryden, who appears in Woodstock for the first time. It is well known that Hon. Mr. Dryden has always taken a warm interest in agriculture, and I am sure it is a pleasure to his fellow citizens in Canada that he has been elevated to the high position of Minister of Agriculture. I also desire to welcome among us our American cousins, who, at great inconvenience to themselves, are present to-day. I refer to Governor Hoard, of Wisconsin, and Hon. Mr. Adams, of the same State. I am sure it is a pleasure to us at all times to welcome in our midst our American cousins. It is a pleasure to us to know the high standing which the dairy interests of Canada have taken in Great Britain. The standing which this interest has taken over there can be raised greatly by meetings such as you have here at the present time, and by the interchange of thoughts and ideas about methods among yourselves. By this means I believe in the future the dairy interest of Canada will attain a far higher position even than it occupies to-day. We know there is always room at the top, and it is pleasing to us to feel that there is a healthy rivalry between our American cousins and ourselves as to who will take the first place. I am sure our American friends here are not selfish enough to wish that the Canadians may not be the first in getting there. There is one matter which has attracted my attention, and I do not think it will be out of place to mention it at the present time, and that is the great interest the newspapers have taken in your meetings. It is to their credit that they have paid such attention, and given such full reports. For, while to those here the meetings are beneficial, the words spoken by the press are scattered in the homes of thousands of readers, and those far away thus participate in the benefits of our discussions. I am sure I can wish for nothing better for the association than that it shall always go forward, and that the interests of dairying, interwoven as they are with the interests of our country, shall always increase its prosperity. I hope that your meetings here will be pleasant. I regret that your stay is short, but I hope that the meetings will not be of interest only to the Association, but of profit to ourselves and to those in the surrounding country who have come here to hear what you have to say. I am sure it is a great pride to every lover of his country to know that it is being developed. I express the sentiments of the council and citizens of Woodstock, when I say that in future I hope this industry may develop far more than it has done in the past. I again, on behalf of the citizens, extend to you a hearty welcome to the town of Woodstock. (Applause.)

Mr. GRANT, President of the Board of Trade of Woodstock, was next introduced and said : I have very great pleasure in being present this afternoon to meet this large and representative gathering, representing this large and important interest. I am sure any one who is at all aware of the importance of agriculture recognises that it is the first of all our important interests. As a member of the Board of Trade I know that agriculture is the interest on which all our prosperity depends, that every interest in this country is dependent upon agriculture ; and while we have among us men of various minds, we all know that the great dependence we have after all is agriculture. I am sure, therefore, we are all glad to know that the dairy interest is in such a prosperous state. I am glad to know that after all the changes of laws and tariffs, still there had been nothing unfavorable to this great interest ; but fortunately we depend for our markets on a country that does not raise tariff walls. We depend on the Old Land, where the people welcome the products of every land. We are glad of this and also glad to know that that interest is developing which we so largely depend on in this section, and that it is not affected by those evils to which I have referred. I

am glad to welcome our American friends. I had the pleasure of listening to one of these gentlemen last night, and I am sure the audience must have been highly delighted with the words of the honorable gentleman. I have no wish to take up your time, but on behalf of the Board of Trade I heartily welcome you to our town, and hope that the holding of the meetings here may be repeated, for I have heard dairymen say that one of the most successful conventions which you ever had was held here a few years ago, and I hope this one may be just as successful and just as profitable. (Applause.)

Mr. C. E. Chadwick, Secretary of the Association, replying, said: It has given me a great deal of pleasure, indeed, to be present with you on this, I think about the 21st or 22nd of these conventions. I do not think during that period there has been more than one or two gatherings at which I have not been present, and participated more or less in the business of the meetings, and I can assure you the present one has been successful in a more marked way than any of the previous ones. We meet here men representing the bone and sinew of the country, who, with true patriotism, are only desirous of developing the interests of our country. I see with me here fellow citizens standing on one common platform, whose purpose is to gain knowledge and secure the dissemination of the success of an industry which has grown from very small beginnings to one of the most important of our country. It was with no little discouragement that the organisation was first formed. It met with those perils which are apt to affect every organisation at first. Those perils have been overcome. We have a great proof of this in the audience assembled on the present occasion, which tells us that we have grown to that degree that we can hardly find a hall large enough in this town to hold the audience. I was very much pleased, indeed, to hear the remarks of the mayor. There was a cordiality about them that made me feel that we had a Canadian sentiment, a Canadian feeling, a feeling of patriotism which to me was peculiarly pleasing. And that is what I want to see in every one in Canada who has an interest in the development of our country. If we act upon that principle, and unite upon it, there are no bounds to the success of our country. It is now more than 60 years that I have been an inhabitant of Canada, coming here when the country was a forest. What do we see now? Extensive buildings, large industries, large commercial transactions transpiring on every hand. People who were struggling for an existence we now find indulging in all those luxuries necessary to the comfort and well-being of the community at large. I was glad to hear the President of the Board of Trade, who came to recognise us. Gentlemen, this institution is forcing itself upon public notice. There was a time when we met, and but little attention was paid by the outside public to our doings. A different state of sentiment is prevailing now. We find public men where we assemble tendering a cordial reciprocity of feeling which is necessary and gratifying to us. I feel gratified to find that we have so excellent a meeting, and that we are so cordially acknowledged by the town of Woodstock. (Applause.)

ELECTION OF OFFICERS.

The report of the Nominating Committee was then read and adopted. It recommended the election of the following:

President	Thos. Ballantyne, Stratford.
1st Vice President	John Geary, London.
2nd Vice-President	Wm. Messer, Bluevale.
Directors.	
Division No. 7	Robert Cleland, Listowel.
" No. 8	Harold Eagle, Attercliffe Station.
" No. 9	E. Casswell, Ingersoll.
" No. 10	John Ballantyne, Pine River.
" No. 11	Alex. McLaren, Stratford.
" No. 12	Wm. Symington, Camlachie.
" No. 13	John Prain, Harriston.
Secretary	C. E. Chadwick, Ingersoll.
Treasurer	J. C. Hegler, Ingersoll.
Auditors	John S. Pearce, London. John Robertson, Gladstone.
Representative to Toronto Industrial Exhibition	Benjamin Hopkins, Brownsville.
Representatives to Western Fair, London	James Carmichael, Arva. John S. Pearce, London.

RESOLUTIONS OF CONDOLENCE.

Moved by Jas. W. Robertson, seconded by Mr. Hopkins, and resolved that: It is with sincere regret that we learn of the prolonged illness of our esteemed President, Mr. J. B. Lane, which has deprived us of the pleasure and benefit of his presence at our convention; and we hereby place upon record an expression of our sympathy with Mr. Lane in his affliction and convey to him our earnest good wishes for his speedy and complete recovery.

Moved by Jas. W. Robertson, seconded by Mr. Hopkins, and resolved that: This Association has learned with deep regret of the sad and sudden death of the late Mr. Wm. Weld, the founder, proprietor, and editor of the *Farmers' Advocate* of London, and hereby places upon record its high appreciation of the valuable services which he rendered to the agricultural community of Canada, by his long advocacy of improved methods and more intelligent practices in the carrying on of their business, and we deplore the great loss which the country has sustained by his decease.

THE DAIRY COW AND HOW TO MAKE HER PAY.

Hon. W. D. Hoard, Ex-Governor of Wisconsin, being called upon, said: Mr. President and fellow-dairymen: We may be sure of one thing, that whether we are Yankees or Canadians, the wind that blows across the borders and gives us our breath, stops not at national lines. (Hear, hear). We may be sure of another thing—and thank God for it—that the language we speak is a common vehicle for the conveyance of a common understanding. We may be sure of another thing, that we are dairymen seeking a common knowledge for the prosecution of a common purpose, and that there are no lines between us in this pursuit. Therefore we come together as dairymen—not as Canadian dairymen, nor as United States dairymen so much, but as men seeking a better understanding and a better "reason for the hope that is within us." Therefore I do not feel that I come before you in the light of a representative of any nationality so much as the representative of a little thought. It is thought we are after. We must think, and the head must constantly precede the work of the hands, and therefore I invite your attention to a few thoughts that have been coined out of years of study and conclusion along the lines of this our common purpose and our common vocation. It is not always pleasant to be engaged in chiding, but you know what the old Presbyterian dominie said: "My freens, he says, "it will nae do for me to be speaking to you aboot the gifts o' grace, because gin I do ye'll get two over-toppin' in yer opinions o' yersels; I better be doing a little on the other side—telling ye whar I think ye must do, and maybe the Lord will bless the words I drop." So in this line—and the line of my thought will be directed as it is, for I bend towards the man who makes the milk. The factory or creamery will take care of itself, though I represent in my own person the creamery interest, but I represent in my own deep interest both of these lines. It is the man who makes the milk that must be constantly reached after. You know the pool in the Scripture account was agitated by an angel who came down every little while and stirred it up; it was not for the purpose of doing the pool any good, but for the benefit of the man who was going to step into the pool. You know the factory or creamery is a pool. We pool the milk together, not for the benefit of the creamery, but to do good to the man who is going to step into the pool.

When the yearly account of the average patron of a cheese factory in Canada or the United States is looked at in the light of good business sense one is astonished at the fact that intelligent farmers, men who call themselves well-posted as the world goes, should be content with such poverty-stricken returns. Something should be done at once to arouse these farmers to the necessity of immediate reform of their ideas and methods. I am credibly informed that the average yield per cow among the cheese factory patrons of Ontario is about 2,700 lb. of milk a year. I am also credibly informed that the average value of milk for cheese-making the past year was 70 cents a hundred. 2,700 lb. of milk per cow at 70 cents per hundred would give $18.90 as the average return per cow from the factory. Allow $6 as the amount the cow will earn in butter before and after the factory closes and you have $24.90 as the average earnings of the Ontario cows for the past year. Any man of sense knows that this sum will not pay for the food consumed on the farm, saying nothing of the cost of labor. All

we have left is the manure. One would naturally expect under such circumstances that there would be close, practical, intelligent efforts put forth to save this manure, the last earthly hope of these farmers for profit. But here again are we confronted with the same demon of waste. Go anywhere, you will find in 90 cases out of 100 the same old folly of manure piled in heaps at the sides of the stables under the wash of the eaves. It actually seems as if men really tried to make the manure as worthless as possible; to get as little out of the cow in this direction as they have in others in a word, to make as little money as they consistently can.

The strangest thing on earth is the indifference and contentment which prevails among dairy farmers on this subject of poor cows and worse methods of farm management.

The next strangest thing is the amount of pounding they will take and not stir a foot out of their everlasting unprofitable tracks. What can be the matter with these farmers? Don't they want to make money? Don't they want to conduct their business so as to have as large a margin as possible above the cost of carrying it on? When every man in the world but themselves can see that they are boarding five out of ten cows at an absolute loss, what makes them so blind to this important fact. Go to any manufacturer and show him that some of his machines are running him in debt every year, and you will see them repaired or displaced for better ones in mighty short order. What makes the average cheese factory or creamery patron hold on to the poor cows and wasteful methods with such deathlike grip when more successful men tell him he is wrong—when his own pocket tells him he is wrong? I don't know and I don't believe he does either. (Laughter.) I have been trying for the past few years to get some information on that point and I suspect that he has as yet taken no pains whatever to find out what it really costs to keep a cow, or what constitutes a profitable cow. It is not that he is lacking in brains. He has as many brains as other folk. He has simply allowed himself to become mentally lazy. It is impossible for him to know the truth unless he works for it. The truth about your business is like any other. You cannot harvest if you don't sow. A study of the truth must be had if we reach the truth.

To see how matters stood with these average cow farmers—what they had done to know the truth of their own business, I put the following questions to 1,000 patrons of cheese factories and creameries: "Have you ever set to work to know what it costs you to keep a cow for one year?" Out of the 1,000 nine hundred and eighty had made no effort to know this important fact. They could guess all over the question. From twenty dollars to fifty dollars was the average. Only twenty out of the 1,000 had seriously set to work to know something for themselves about their business in this particular Think of it, my brothers! Should we not be ashamed of such indifference, especially when it is costing us so much? Another question, equally important, was asked of 200 average, well-to-do patrons of cheese factories: "Have you ever made any effort to know what each of your cows was producing for one year?" Out of the 200 197 answered "No." Now, that is as near as I have got in determining what percentage of dairy farmers are really dead in earnest to know what they must know or be badly punished for not knowing. It looks bad. It is the lack of this necessary knowledge that makes the beggarly showing in pounds of milk and pocket for the patrons of Canada and the United States. It saddles the hard-working farmer with the cost of keeping two poor cows, waiting on two poor cows, stabling two poor cows to do the work of what should be done by one ordinary good cow. Do you wonder he is bowed down and discontented with the business? Oh, that he would stand up and look his own deficiencies in the face!

What does it cost to keep a cow a year on the ordinary dairy farm? In the first place what is the pasturage worth? I find that it takes from three to four acres of land, as farms run, to pasture each cow,—call it three and a half acres. What is this land worth in your dairy districts? Dairy farms sell for about $40 an acre. If my figures are too high or too low adjust them to suit the fact, but this is my best information. Now, the cost of pasturage is the interest on what the land will sell for; the taxes and annual depreciation in fencing—all of them cash items. Three and a half acres at $40

per acre represents $140 invested in land to pasture a cow. What is your interest rate? Call it seven per cent, which will amount to $9.80. The taxes may vary, but may be fairly set down at this valuation, at one per cent. or $1 40. The depreciation in the value of the fencing will also greatly vary, but it cannot be less on ordinarily fenced farms than one per cent. annually. This would amount to $1.40. It usually requires the labor of one man for ten to fifteen cows, but we will allow the manure to offset that, provided you will agree to handle the manure so as to get your pay. At the estimate I have given, it costs the average farmer, to pasture the average cow, as follows:—

Interest on 3½ acres of land at 7 per cent.	$9 80
Taxes	1 40
Depreciation in value of fencing	1 40
	$12 60

Winter Keep.—To keep a cow through the winter in such condition as she will do her best the next summer is a matter of common necessity. Hence she must be well kept. This will require the value of at least two tons of the best hay, which in Wisconsin may be set down at $16. Add to this at least $3 worth of grain, to keep her in the tone and condition I spoke of, and you have the sum of $19 as the cost of winter keeping of the average cow. This makes a total for the year of $31.60. If you think the figures are so high as to upbraid your conscience too much, cut them down, but remember your pocket. Now, compare what you get from your average cow—$24.90—with what she costs to keep, and tell me honestly do you think it pays to be an avearge dairyman and keep an average cow? The only way out of the woods is to be more than an average dairyman in your understanding of your business, in the methods you practice. The moment you do that you will not be contented with this average cow. The average cow, which costs more than she gives, is always the product of the average dairyman. The dairyman was produced first.

Let me suggest a few things for you to consider: First, set about the task of knowing for yourself just how many pounds of milk each cow in your herds produces every day in the year. Don't think this is such a big thing to do. Buy one of these double-indicator spring scales. One of the indicators is stationary, as in the ordinary scale; the other is movable. Hang the pail on the hook and push the movable indicator to the upper, or zero mark. When done milking, hang the pail again on the balance. The stationary indicator will record the combined weight of pail and milk, and the movable one the weight of the milk alone. Tack up behind each cow in the stable a strong sheet of manilla paper, ruled off, with the months and days. Hang a cheap lead-pencil beside each sheet. In this way set resolutely to work to know the all-important facts of the dairy production of your cows.

Breed Better Cows.—Our average dairyman must have a better cow. That is very evident from what we have seen. How will he get her? Breed her. He can buy good thoroughbred bulls of every dairy breed at fair rates. Don't be fooled into the notion of a grade bull, get a thoroughbred. Breed your cows in January and February so they will calve in September and October. That will push you into winter dairying. Don't be afraid of it. My word for it, you will never regret it. The cheese factory will accommodate itself to your notion mighty quick. When you commence to make milk in the winter then you will commence to study the finer economies of good stabling, the production of cheap food, like ensilage and the way to handle a dairy cow. Then you will hire your help by the year and thus get your help cheaper and turn a long and expensive winter to profitable account. You will find that it costs only about 15 per cent. more to keep a cow in milk, if you have a warm stable, than it does to keep a dry cow, as she should be kept if she is to do well the next summer, while the winter milk is worth 30 per cent. more than the summer milk. Then again a cow calving in September is six months in milk when she strikes the fresh croppage of spring grass and thus enlarges the flow. When a cow calving in March or April is six months in milk she strikes shrinking feed and colder weather and naturally shrinks instead of enlarging her flow. Thus

a winter cow of the same capacity will yield more milk in the year than a spring cow. I believe the coming system here in Canada will be to have the cows come fresh in the fall, make butter through the winter, thus having the skim milk to feed the young stock. That will give them a good six months' start on skim milk, and at the end of their six months period they will get the benefit of the fresh pasturage, the same as the cows, and it will have the same effect in their growth that it does in milk with the cows. When spring opens turn the milk to cheesemaking and continue till July 1st. Then dry off the cows and give them a rest until September again. Another important gain under this system will be that both the patron and factory will have a ten months' season of business instead, as now, one of six or seven months. It is a very easy matter in these days of separators for a factory to adjust itself to both butter and cheesemaking in the way I have indicated; but remember the first move towards this end must be by the patron. He must produce the winter milk before we will have the winter factory.

In the foregoing remarks I have endeavored to indicate in the main two things, the evils of the present system, as produced by the average dairyman with his average cow and average method of doing things. He must brace up and correct his ideas, for his ideas are wrong, and as a consequence his practice is wrong. "As a man thinketh so is he." I have tried to indicate what I believe would be a profitable change in our co-operative work, viz.: winter dairying.

I wish before I close, however, to read to you as an instance of the present care of cattle in Ontario, something that was received for my paper the other day from my Canadian correspondent. Lest you should say I am exaggerating the condition of things here, I am going to give you the testimony of a man who will stand as state evidence:

THE COW'S CHRISTMAS EVE.—*Ed. Hoard's Dairyman.*—Driving across the country the day before Christmas, I passed a herd of twenty-four dairy cows. It was about 5 o'clock p.m., and the unoffending creatures stood where the teeth of a bitter northeast wind could gnaw at their vitals to the greatest possible advantage. Behind the bars of that cheerless, open field they patiently and plaintively waited for the coming of their heartless owner, or attendant, to hunt them home, perchance, with a dog. That would warm 'em up, and help let down the copious streams of milk which those shivering bovines had elaborated while they browsed around among the hemlocks and tamaracks of the adja ent swamp, or nibbled at the luscious tufts of grass, brown and stiff, that here and there cropped above the snow. This is no fancy but plain facts, without gilt or varnish, and in Ontario amid the full blaze of dairy gospel day! Shades of Arnold, and Harris, and Lewis, the men who long ago taught our dairymen to treat their cows as gently as they should a woman and a mother, can these things be! We certainly know better, but too many farmers will not learn to *do*. The heathenish owner of that herd had no thought that the Christmas gospel of "good will" applied to dairy cows. He sowed to the northwest wind—what will he reap?

I wish also in this connection, to read to you another little extract, which is the work of a progressive dairyman, Mr. C. P. Goodrich:

C. P. Goodrich, of Fort Atkinson, gives a short talk "How to make Dairying Profitable," as follows: "The only way to find out about anything is to keep an accurate account. Different cows must be tested as individuals. One must first find out how unprofitable dairying is under the old plan. The first item is to reduce the cost of production. We feed each cow $30 of feed per year, consisting of one acre of pasture, $5; 5 tons ensilage, $5; 1 ton clover hay, $5: 1 ton bran, $15; and make from each cow 320 pounds of butter, costing for food per pound of butter, say 10 cents. We estimate the cost of care and making butter at $20 per year, per cow, making a total cost of $50 per year for feed and labor. We get in return 320 pounds of butter, which we sell at 24 cents, $76.80; skim-milk worth $10; calf worth $3; a total of practically $90, or a profit of 80 per cent. on his $50 invested. Without the silo it would cost, at least, $40 per cow. Good care is a great factor in reducing cost of production. One day's exposure to a cold October rain reduced my twenty cows from 28 pounds of butter per day to 25 pounds, and I have not yet been able to feed and pet them enough to recover it. Marketing is a very important point. We first used to trade butter for sugar at the store, pound for pound, but that did not pay. We have tried getting private customers at a stated price the year around but found it unsatisfactory. When butter was higher they wanted all we had; when it was lower they did not want so much of ours. Had been most successful in shipping to a reliable commission house. Have been shipping to one house steadily every week for the past eight years; always shipped the same day of the week, and the same butter, didn't make it the way we liked it, or the way my wife liked it, but the way the consumers liked it. We averaged 24 cents through the year. A farmer could make it pay with ten cows, but more would be better. Must make butter winter and summer, about the same quantity, and always the same quality. Results were only to be attained by hard work, close observation, and persistent application."

We have in our creamery a weather account, and we discover that the milk yield slides up and down according to the weather. Accordingly, every man ought to watch the weather. Why? Because the intelligent man sees the coming of a cold storm; he does not want to pay in milk for that; the cows are brought up and put in the stable and the yield is not diminished. Mr. Goodrich, made his cows produce 357 pounds of

butter in one year. But this was the result of thinking. You may not be able to do this to-day, or to-morrow, or next year; but let us have an understanding of one thing, that if the Canadian dairyman will rise up as he ought to, he can set resolutely to work and in three years can have a better cow; and then, treat, handle and feed her according to the deductions of the best judgment of modern dairying. (Applause.)

A Voice.—I would like to ask what kind of stock you would like to ask what kind you would introduce for the purpose of making butter.

Mr. Hoard.—The question that is asked is a hard one to answer. My friend, it is pretty nearly the same as if you were to ask me what sort of a woman a man ought to marry. (Laughter.) It is a good deal a question of taste. A man may have a peculiar taste, and he succeeds very well generally if he follows his taste; but there is a certain line of distinction which, I think, should be adhered to. Men should select a breed of cattle in the line of that which they wish to do. Now, if men are making butter, or making cheese, they need good milk; and whether handling Jerseys, or Guernseys, or Holsteins, I would always discard any one of them as a breed if they did not give me good milk, and I would know whether they gave me good milk or not. If one is adhering thoroughly to butter production, it is altogether likely that the Jersey, or the Guernsey cow is a breed that will give a larger production of butter-fat, for the feed consumed, than almost any other. There are families of Holsteins that are very superior in the daily production of either butter or cheese. There are other families which are nearly worthless. There are families of short horns that give a large return. Now, you cannot make a rule here. It needs that distinct judgment on the part of a man to guide himself in this particular. My own preference I have no business to give. That is the same as I exercised when I married a certain woman; and I didn't marry her in order to please anybody else except ourselves. (Laughter.) I want to add that we must get out of our notion—that there is a butter cow and a cheese cow. There is no doubt, there are certain cows more profitable for cheese-making than they would be for butter-making, but we must get out of the notion that poor milk is profitable for either cheese-making or butter-making. Mr. Ballantyne told me, for instance, that when he was over in Scotland, while ordinary cheese there was selling for 43 shillings, some of the very best was selling for 60 shillings. He found the increased value was because there was about ten per cent. more fat in the latter. Now, the present system of cheese-making and creamery business encourages a man to make poor milk; it puts a premium on it. That system must go, and men are coming rapidly to the conviction that milk should be taken into the factory and pooled, and every man get his dividend according to what he puts in. That system will come, and I think the nearest way to get at it, is a measure of the fat in the milk. A few of the factories are doing it in our State. The only men that "kick" are the men who cannot make a dishonest profit out of their neighbors. (Applause.)

The Same Voice.—The reason I asked the Governor this question is because I have heard a great many say grades are best for milk.

Gov. Hoard.—I don't think grades are as good as thoroughbreds. It would be nonsense. But I think this, we have got to take the thing as we find it. Farmers can go and work a grade up, using a thoroughbred sire. We have to use the cow we now possess. If the cow we commence with is half-blood, the next should be three-quarters, and the next should be seven-eighths, and so the nearer we got to pure bloods in that direction the better. Now, don't go to work to crossing out. I know men who produce a lot of "hash." I heard a man jump up in our farm institute who had thoroughbred sheep, and who crossed Merinos and Shropshires and South Downs, and he said his sheep "Wa'nt worth a cuss." Mark the conclusion that man came to: he said, "I tell you that them thoroughbreds are confounded humbugs, every one of them."

WORDS OF ENCOURAGEMENT.

Hon. John Dryden, Minister of Agriculture, was then introduced. He said: It gives me extreme delight to meet with the members of this Western Dairymen's Association. I would feel like saying something about the nobility of this gathering had it not

been for the remarks of the secretary, and I am almost afraid to do so lest you might think that I was a politician, and wanted to give you a little "taffy." Now, when a man in the position of your secretary, who has looked into your faces so many years, is struck with the gathering before us, you need not wonder at many of us being struck who see you for the first time; and I can assure you it has done me a great deal of good to sit on this platform and look into your faces. You used to be taught that we must expect wisdom from the east. I had the pleasure of attending the Eastern Dairymen's convention at Brockville, and when there I found a gentleman who had come from a place still farther east, in the Eastern Townships, and he said he had come up to learn wisdom; and while I was there I heard a gentleman whom I had heard named as your future president, speaking of the way you do things in the west, and ever since I have had a longing desire to meet with you and hear for myself how things are being done by you. Well, I am bound to say the further you go west the more wisdom you behold.

It is not that you have got wise men, but you have such a large number of them. It is not only that they come from the Eastern Townships to you to get wisdom, but have sent some of our men to the mother-land in order to teach some of them there your system of cheese-making. According to the definition given by Prof. Robertson, when some one asked him what he considered a good Scotchman was made of, "He is a good Scotchman who keeps the Sabbath and everything else he can lay his hands on." (Laughter.) Now, these Scotchmen in the mother-land have laid hold of much of your system, and they are making such good use of it that now I find Mr. Ballantyne expressing some concern as to whether we are going to hold our own in that country or not.

Too much praise cannot be given to those that have made this industry what it is, but we must not forget that we cannot rest on these past laurels, and if we are going to make progress, you must have enterprise and ambition to do better than what has been done in the past. It will never do to stop where you are, and if new and better machinery and methods are discovered we must lay hold on them. I meet a good many who are real good Reformers in politics, and I like them firstrate, but somehow, as farmers, they are very stiff conservatives; and when I talk about the advantage of a silo they don't want to hear anything about it, because it is not according to the old plan. So to speak, they are like Old Aunt Peggy; they faint when anything like an innovation is mentioned. I have heard, when people did not make churches so comfortable as now, and it was proposed to introduce a stove into the particular church to which Aunt Peggy belonged, so that the people would not be obliged to sit loaded with winter clothing in order to keep warm, that Aunt Peggy objected. A good many thought it was objectionable, and it was a new thing and it was not a right thing. Aunt Peggy said: "It will get so hot I am sure I will faint right in the middle of the service." But notwithstanding her protestations the stove was put in, and sure enough when she passed up the aisles to her seat the next Sunday she spied this monstrous thing, and she actually did faint in the middle of the service. But she very soon came too; some one whispered in her ear: "There is not a bit of fire in the stove." (Laughter.) Now, there is no use of our fainting because some change is proposed. If you propose to hold the place of the best you must advance. You will need to have good cows and good feed, and mind to take care of them; and when all those things are complied with, I have great hope that the results will be that we will be able to hold our own, even with our good American friends who are able to give us so much wisdom.

Now, in all business there must be uniformity, and this must be the case with cheese if we are going to take the top place in the foreign market. It must be of as good quality as possible. If we have the best cheese I will guarantee it will make its own market. I remember going to the farm of Jas. I. Davidson, who deals so largely in cattle in this country, on one occasion, and saying to him: "Uncle Jim, that's a fine calf you have there." "Aye, is it," he said. I said, "You will be wanting a good deal for that?" "$400," he replied, "and the man is born that will buy it." So it is all around. I will venture to say if you can produce a uniform quality of fine cheese it will find its own market.

Now, every one of you—the cheese dealer, the cheesemaker, the farmer who produces the milk—has a double interest in this result. The man who is tampering with the milk

and thinks the factory owners will never know anything about it is throwing down a boomerang which will hit him just as sure as possible, and he ought to get hit. But it is not that he is hitting himself only, but he is injuring all who send milk to the factory. I am perfectly certain of this. As most of you know, I have not been a dairyman, but I have come to this conclusion, that if we are to hold our own in regard to the manufacturing of cheese and butter we will need to go forward with the system of instruction and inspection we have had in the past. You will perhaps have to make the system more efficient, and that is one of the ways the Government may assist you. I think it is perfectly legitimate for the government of a country to assist in the dissemination of knowledge by which the people will be able to produce a better product than ever before. Some of you will have noticed that I have already struck out on these lines. I have struck out in this way with a view of giving the farmers the fullest information it is possible to give them. I believe I am right in that, and that all classes of the community will stand by the department while we are trying to do that work, because every class is equally interested in the prosperity of this great industry. As has been said this afternoon, agriculture is the foundation structure upon which all the rest is built.

Now, who is to give this instruction? Nothing has delighted me more than to find so large a number of the young men at this convention. And what are they here for? Here for instruction—that they may learn—and I think it is right, fair and proper that they should be given the fullest information that it is possible to give them. We talk about the future of this country of ours, and I believe we have a grand future for agriculture. But it is yet to develop. Who is going to do it? I say it is these young men into whose faces I am looking this afternoon. These are the men who are to add to the wealth of our country. Is it those dudes I meet in Toronto who wear tall hats and twisted moustaches and carry a cane about the size of your little finger? Not at all; but these young men who are here, the sons of the farmers willing to devote their attention and brains and intelligence to this grand work and noble calling of agriculture. These are the men who will make the agriculture of this country what it ought to be. I would like to take every one of them by the hand. I would like to say "Do not stand aloof from those who are not so intelligent as yourselves, but take your brother's hand and help him up to the same plane as yourselves and struggle together until you all reach a higher and higher plane." I assert everywhere that this calling in which you are engaged is one of the most noble in any country; but there is abroad a sentiment in the community a sentiment that it is a sort of mean thing to milk cows and be a farmer; that it is a sort of disgraceful thing, and that if a young man wants to be anything he must turn to some literary pursuit, or be a lawyer or a doctor. I would like to get away with such a sentiment as that. Now, I am not a very proud man, but I believe I shall involuntarily lift my head a little higher because I have been privileged to look these young men in the face. I believe, as I work in my Department, that it will make me feel a little higher and loftier than before. You won't blame me if I do.

I came here to listen, but I want to say before sitting down, that, as the head of the Agricultural Department in this province you have in me one who is your friend, one who sympathizes with you in your work, one who, so far as possible, will endeavor to aid you in any legitimate and proper way. You need not remain satisfied with your past achievements, but it is your privilege to move forward and forward, and if we but scatter the information we hope to do in future years we will be able to keep this province in the foremost place, which it has always kept in the past. (Applause.)

Mr. Chadwick expressed his gratification with the remarks of the Minister, which showed that he was the right man in the right place. Heretofore he had always felt that all the assistance which might be rendered by the Government to the agricultural interests of the country had not been given.

Mr. John Geary, the new vice-president, was called to the chair in the absence of the president elect, Mr. Ballantyne. Mr. Geary acknowledged the honor shown him by his election.

A vote of thanks was tendered to the retiring vice-president, Mr. Hopkins,

AN EXHIBITION OF MILK TESTING.

Prof. Robertson said: In the course of my remarks last night and this morning I recommended cheesemakers to test cows as to the quantity and quality of their milk for cheese-making. The Babcock testing machine seems to make a test at very small cost. Mr. Robert Ballantyne, of Stratford, was good enough, at my request, to bring here a Babcock testing machine which they have, and I would like to have him show the farmers how it works. The total cost does not exceed one-half cent per test and the test can be made in four or five minutes. I think every factory should have a machine like this so that every man's milk could be tested each morning, and then no one could be dishonest and we would be bound to get better cheese.

An exhibition of the practical working of the machine having been made, Prof. Robertson explained the principles of its working. First of all a small portion of milk, apparently representative of the whole sample, is taken in a pipette which holds 17.6 centimetres of milk. That quantity is put into one of these bottles in the machine and a small quantity of commercial sulphuric acid is measured in this small tube; that is, put with the milk. Then they are shaken together. The mixture is then put in the bottles into this small drum, which revolves on the centrifugal principle, the idea being that the centrifugal motion will cause the cream to flow to the outside as the drum is revolved by means of this big wheel. Then, after the motion has been continued eight minutes, going 800 revolutions per minute, these bottles are taken out and filled up with water. The motion is then continued for 1½ minutes, and then you can read the per cent. of fat by the nick on the bottle, and this one reads now 3 3-5 per cent. fat in that sample of milk. By having two samples of the same milk you get a sufficiently correct test, and then you have a demonstration of the accuracy of a test to show to a farmer. The machine costs about $35 after the duty is paid.

A Voice—Can you tell whether the milk is skimmed or watered?

Prof. Robertson—You can only tell by this the per cent. of fat.

Hon. Mr. Adams—I wish to say just a word in connection with this test. I happened to bring along with me a record of 14 tests of 14 cows in my herd, made with this machine. We have thoroughbred registered Jerseys. I took samples of these cows, weighing and comparing them together 14 times, one way and another, and taking them up to the experimental station at Madison, and I got this list of percentages of butter fat, which I will read to show you the difference of value in the milk of individual cows:—

Cow No.	1	gave	26	lb.	of milk per day, averaging	4.16	butter fat, indicating a butter yield per week of	8.96
"	2	"	24	"	"	4.44	"	"	"	8.82
"	3	"	17	"	"	4.87	"	"	"	7.14
"	4	"	34	"	"	5.28	"	"	"	14.94
"	5	"	22	"	"	4.38	"	"	"	8.12
"	6	"	29	"	"	4.57	"	"	"	9.94
"	7	"	30	"	"	4.51	"	"	"	11.34
"	8	"	20	"	"	6.39	"	"	"	10.62
"	9	"	25	"	"	5.04	"	"	"	10.50
"	10	"	28	"	"	3.75	"	"	"	8.75
"	11	"	36	"	"	4.57	"	"	"	13.04
"	12	"	27	"	"	3.81	"	"	"	7.47
"	13	"	26	"	"	4.28	"	"	"	7.77

Indicating an average butter yield altogether of 11.40. I found this surprising fact that some of the cows which had the largest per cent. of milk gave the largest per cent. of fat. That was in the month of July, about the 8th of the month, when the weather was extremely hot and the cows were upon rather a short pasture and received less than a pound of shorts per day—just a handful; and I found to my surprise that some of the cows which I did not suppose were very good were ahead. It occurs to me what a grand thing it would be for an ordinary farmer who has 10 or 15 cows, and does not know anything about the value of their milk, if he could send samples of his milk somewhere and have it tested by this machine. It costs but a mere trifle to have a test made, and if this were done farmers could work with some assurance that they know actually and positively something about what they are doing.

FINANCIAL STATEMENT.

The annual report of the auditor's was then read as follows :

To the President and Members of the Dairymen's Association of Western Ontario:

GENTLEMEN : Your Auditor's, appointed to examine the Treasurer's books beg leave to report that they have duly examined and compared the same with the vouchers and find them correct, showing a balance of $222.54, for which the treasurer has presented his marked cheque.

The following is a statement of the receipts and disbursements for the current year:

RECEIPTS.		DISBURSEMENTS.	
Balance on hand	$556 16	Expenses of Convention	$200 29
Proceeds of Convention	121 00	Salaries	246 00
Proceeds of Bills Payable	781 26	Printing and postage	75 24
Contribution from T. Eaton & Co	5 00	Sundry accounts	24 85
Government Grant	2,000 00	Cheese inspector's	1,775 00
Receipts from Factories	255 20	Board meetings	94 75
		Bills payable	800 00
		Expenses deputation to Ottawa	80 00
		Grants to Exhibitions	200 00
		Balance on hand	222 54
	$3,718 67		$3,718 67

All of which is respectfully submitted.

JOHN ROBERTSON, }
J. S. PEARCE, } *Auditors.*

Dated January 22nd, 1891.

A LETTER TO PATRONS.

Mr. SAMUEL HOWARD, was requested to read a letter which he sent last summer to the patrons of the factory where he was working. He said : "There is one thing I have been impressed with ; that is the necessity of proper instructions to patrons of factories as to the care of milk. I had been accustomed to send them bulletins which Professor Robertson got out from time to time at the Experimental Farm, and found they did a great deal of good ; but these were becoming a little stale because they came from the Government Farm, and for this reason, I thought I would write this letter. I had written several times before in an encouraging way, and some of the people took note of what I said, and governed themselves accordingly ; but some of the patrons were continually sending milk in poor condition. The following is the letter :

PEOPLE'S CHEESE FACTORY.

GORRIE, August 16th, 1890

DEAR SIR : I take this opportunity of thanking all the patrons of this factory who have tried to care for their milk to the best of their ability. I may say that I know who the successful ones are, as well as state that I believe without a doubt the reason why some of the milk sent to the factory is not so good as it used to be is because a number of the patrons either don't know how, or are too careless, to properly clean, scald and air their cans after the sour whey has been returned in them. I therefore ask all hands to try and have the whey emptied out as soon as it has been returned, and throw a pailful or two of cold water into it till noon if you cannot have boiling water conveniently before then. Make it a practice to have a large pot or kettle full of boiling water ready for the purpose of thoroughly scalding your cans after they have been thoroughly scalding your cans after they have been properly washed. When washing it is a good plan to take a handful of salt and a damp cloth and scour the can well, seams, corners and all. Then, as I said before, have your water at the boiling point, and let me tell you that you might just as well try, if you were dressing hogs, to get the hair off clean without boiling water, as to try and get the acid taint

out of the tin with water you could put your hands in. You know how the former would work. Well, having your boiling water ready, pour it into the can all around the top and put on your cover and turn the can on its side on a bench or clean board and roll it over a few times, then empty out the water and leave your can on a bench, or saw-horse, or somewhere to air till milking time, out of reach of the ducks and turkeys, and, need I add, little pigs. For if some people who think their milk is pretty clean saw it as it is emptied into the weigh can they would probably be astonished to see what I call, for want of a better name, a "ground hog." I have seen the dirt as much as two feet long from the time it would head out till the tail would slip over the lip of the can; and more than that, I have also seen the nest sometimes. If there is one, you will generally find it located near the centre of the bottom, on account of the motion of the milk, and it is usually composed of earth, or something of that nature, which would be more profitable if it were put on the land than if sent to the cheese factory. I must say, however, that there are a large number of the patrons send their milk free from anything of this kind, and have it also well handled in other respects, and can be counted O.K. everytime. And why not all? For, if I put one hundred pounds of milk that has been tainted with gas from want of proper airing, or that has been polluted by being put into a can that has not had the acid taint removed by boiling water, or has been tainted by the breath of ground hog, into a vat containing five thousand pounds, it will affect the whole mass, for it is something like the leaven that the woman took, that we read about in the Scriptures, and put in a quantity of meal till the whole was leavened.

I would also ask you not to allow your milk to stand outside in the cans when the nights get cold in the fall, but aerate then the same as you would in warm weather, and leave it where the temperature won't fall below 50 degrees Fahr. Milk that has been chilled acts much the same as yeast the ladies set for making bread if it gets too cold; and trying to make good cheese out of frozen milk is like trying to make good bread out of frozen wheat flour. I am exceedingly anxious that the cheese we are now making for the fall trade be of the finest quality and free from whey flavors, as this is most objectionable in cheese for the English markets. It can be easily avoided if all hands will but follow the valuable instructions contained in bulletins on the care of milk by Professor Robertson, which I sent you all. It will also help if you tack up this circular where you can read it frequently, and educate your servants therein, as well as teach these rules to your children, and to your children's children, for they are good, and if put into practice each day we shall have no fear of results.

I also give you all an invitation to come to the factory and see your product handled. Remember, it is your factory; so come along whenever you like, and walk right in without rapping and find out whether we are attending to business or not.

Your obedient servant,

SAMUEL HOWARD.

REPORT OF COMMITTEE ON RESOLUTIONS.

Mr. J. M. BUTCHART, read the report of the Committee on Resolutions, as follows, which was adopted at a later stage of the convention:

Resolved.—That it is the voice of this Convention that cheesemakers should have in every county where the cheese industry is concerned, co-operative organisations through which they could work in harmony, and facilitate matters of reform, and that they should send annually three delegates to this Association. Also, that the secretary of this convention issue circulars to all factorymen and cheesemakers, calling them together at some central point in each county for the purpose of organising. Cheesemakers and factorymen in the different counties should send in their name and address immediately to the secretary; also suggesting some competent person to take charge of the meeting.

Resolved.—That the convention believes that it would add to the interest of the Dairymen's Association for the secretary to issue annually circulars to all factorymen requesting them at their milk meeting, to appoint three or more delegates to attend the Association's annual convention

And also, we recommend that some method be adopted that the cheesemakers and patrons could meet at their factories or some central point monthly, to talk over the care and proper handling of milk, to assist the cheesemaker to produce a better quality of cheese.

A VOICE—The question of dairy schools was referred to this committee on resolutions, but they have not brought in anything in regard to that subject.

It was stated that this matter would be dealt with in a separate resolution.

The convention then adjourned.

EVENING SESSION.

INSPECTORS AND INSTRUCTORS.

Mr. JOHN ROBERTSON, sr., gave an address on the above subject. He said: I wish simply to give a few thoughts on the inspection of milk and the instruction proper to be given to cheesemakers, and that opens up a very wide field. I thought in order to bring that subject before your minds in an intelligent, attractive and instructive manner it would be best to look at the question from three different standpoints, to see if we can find the necessity for inspecting milk and for appointing instructors, and if we can find that there is a real necessity then it will be for the meeting to try to devise the best plans, and adopt the best methods to meet that necessity. I thought, to condense my ideas, we would first take a view of the cheese trade in the country fourteen years ago, and, in the second place, make a little *resumé* of what it was four years ago, and, in the third place, make a *resumé* of what it is to-day.

Now, in the first place, we have to go back to what the cheese trade was fourteen years ago. Fourteen years ago our Canadian cheese was selling in the Scotch and English markets from fifteen to forty shillings a hundred weight, or less money than the higher Scotch and English cheese were selling for. When men began to study the business and put thought, and will, and power, and purpose into practice, then we began to creep up and creep up, and kept improving, until four years ago our finest fall cheese was just about on an equality with their Scotch and English cheddars.

Now, where are we to-day? The difference in the value of fine cheddars in England and the same in Scotland and ours is nearly as great to-day as it was fourteen years ago. To-day in England their finest cheddar cheese is selling at seventy up to eighty shillings, and a very common price for fine English cheddars is from sixty to sixty-two shillings, and the same for Scotch cheddars. The great bulk of the summer cheese that has been sold in the Scotch dairy counties in the last three months has ranged from sixty-two to sixty-nine shillings. What has been the range of our Canadian cheese? It has risen from forty-nine until to-day it is at from fifty to sixty shillings. It is not that ours has deteriorated either in quality or in uniformity, but it is because the Scotch and the English have gone gradually away ahead of us until they are now as nearly as far ahead of us as they were fourteen years ago.

Now, what are we to do? Are we going to stand still and allow them to take our best young men to improve their produce, and get all they like to ask for their fine produce and leave us to plod away in the cold and do the best we can? I misjudge the temper of the young cheesemakers of this country if this is to be the way. I think there is energy and brains enough in our young cheesemakers who are rising to overtake the Scotch and English yet. But you know this, that lost ground requires a double effort to overtake those who are ahead of you. Now, if we have got a long way behind there will be a greater need for more energy until we overtake them. In a race the object is not simply to overtake the ones that are leading, but to pass them. Let us get this idea into our brains, that if young men have gone from Canada to do what has been done there, could not the same young men or their equals, do the same thing here. Can it be done or can it not be done? I believe it can, but I believe it won't do itself. I believe it will take a good deal of talk and hard work, both with brains and hands, before it will be done, but I believe it can be done.

Now, if it is to be done, where are we to begin, or what are we to do? I am simply throwing out a few thoughts that you may take hold of them and discuss them. You have heard a good deal to-day about beginning with the cow, but I would prefer beginning with the man; and if you get the right form of man and get a man that is sound on the dairy question, the man will soon begin to put the cow right, and after that the manufacturing right, and that will put the markets right very soon.

Now, I find that the question of profit in dairy cows is only beginning to be thought of. It is a matter that is simply in its very infancy—the real thinking of and working out where and how the profits are made out of the dairy cow; and to bring that thought before you just in a few moments: You all know of the competition in London a year ago, and in Toronto just last summer, brought about by the prizes offered by the late lamented Mr. Weld for the cow that gave her owner the greatest profit on the milk she produced from the feed that she consumed. I think no one will be prepared to question the correctness of the tests that were made; but the way they were published did not make it very clear to my mind that an ordinary farmer would be able to comprehend or gauge the point where the prizes were made. A very strange point that comes out about it was that the cows that got the 3rd prize were actually the cows that gave the most milk. The ordinary farmer would say, there has been some gouging about that somehow or other. Another thought I want to give you is that the cows that got the 3rd prize gave the best and richest milk. I have been to the trouble to work out the figures and I think I am able to explain to you how the cows that gave the least milk got the first prize, and how the cows that gave the best milk got the 3rd prize. The secret was not in the quantity of milk or the quality of milk, but in the way in which the cows were fed. There is where the whole secret of the thing comes in, and if you will just be careful enough, or take interest enough in it, either to take a note of it or to take it into your brains you will think the case remarkably strange. The cows that got 1st prize were daily given 3.80 pounds of bran, 2.02 pounds of ground pease, and 1.10 pounds of ground corn, which was 6 92, or nearly 7 pounds, of grain food. In addition to that they had 22 pounds of cut corn stalks with the ear on the stalks, and 1 pound of hay. The total was 30.14 pounds, weight of all food consumed by each cow per day, and the food cost 9.30 cents, or a little over 9¼ cents each day. It was because that man fed his cows nearly a half cheaper that gave him the prize. The 2nd prize cows were fed with 4.03 pounds of bran, 4 33 pounds ground oats (that gave them 8 36 of grain food) and 12 pounds of hay; altogether 20.36 was the total weight of food which they received, at a cost of 12.02 cents per day. Then the 3rd prize feed consisted of 7.10 pounds of bran, 7.10 pounds ground pease, and 6.66 pounds of hay, which gave a total of 20.86 as the total weight of feed which cost 14.26 cents, or a little over 14¼ cents per day; and the reason why that man was put back to the 3rd prize was because his cows cost so much to keep. Now, to give you an idea about the quality of the milk. It would have taken far too long a time to have read the figures over, and figures are dry reading; but for the 1st prize the average was only 4 08 per cent. of butter fat; that was for one day; the average for the next day was 4.39, and the average for the next was 4.83, giving an average for the whole test of 4.43. Now, a good many people don't know what that would mean; but it simply means that out of every 100 pounds of milk there was 4.43 pounds of butter fat. Now, the butter fats were valued at 16½ cents per pound. The casein and other solids were valued at 2½ cents per pound. So they were all valued at the same value, and the food was valued at the same value. They were all treated alike, and each man was alowed to feed what he chose The first were Jerseys and the second Devons. The average yield of butter fat of the 2nd prize cows for the first day was 3.99; for the next day 4.28; and the next 4.70; and their average was 4.32. So that you see their milk was not so valuable—did not bring so much money as the 1st prize did, and then they were fed at a cost of nearly 3 cents a day more for food. Then the 3rd prize cows were another lot of Jerseys which gave far the richest milk of any. The first test gave 5.34 butter fat; the second 5.58, and the next 5.19, or an average altogether of 5.37 Now, the next point I want to give you is this—it was the profit on the milk that counted in winning the prizes. The 1st prize had $1.10 of clear profit out of the milk produced after paying for the food consumed; the second had 95 cents of clear profit for the milk after paying for the food consumed, and the third had 48 cents profit after paying for the food consumed. You see where the food counted in winning the prizes; it was the feeding that did it entirely. One thought that struck me was this—what ration of food made the greatest difference? The 1st prize cows consumed 22.22 of corn with the ears on it. You see the difference in the price of the corn with the ears on it and of timothy hay makes nearly the difference in the

price of the hay. The grain feed of these cows was bran, pease, and ground corn; of the second bran and oats ground, and of the third bran and pease alone and hay. Those were the different rations, and you can take that with you and experiment just as you have a mind to. The milk and the cows were under supervision. The milk was tested by chemical tests by an assistant of Mr. Macfarlane, the chief analyst at Ottawa; so there were no chance for underhand work. You see how much difference comes in between the breeding and feeding of cows, and again in getting a good profit or a less one just owing to the care or management of the feeding.

The reason why I took up this subject to-night was that, in order to make more money out of our dairy and in order to improve the quality of our dairy the first thing that has to be considered is cheapness of production of the raw material. You know the man in business who can get equal quality of raw material ten per cent. or even five per cent. cheaper than his neighbor is going to outrun him, and it is going to be just the same with dairying. Don't you think that man who bed his cows at a cost of 9¼ cents a day is going to make money far faster than the man whose feed costs him 14¼ cents?

Now, that brings us to the question, how are we to regain our lost ground, and how are we to overtake the Scotch and and the English cheesemakers in their own markets? In order to make this all clear to you—because you are all interested in the cheese business—what have been the special faults and defects, during the last season especially, that have been telling against us? I am not in a position to say very much from personal knowledge, but I am told that in the fore part of the season there were two things about Canadian cheese that tended to reduce their money value very much; and one was that they were too stiff and too hard, and when cut and laid upon the counter they were apt to open up and show little cracks and a rough face. They were not a cheese that is meaty, or that will cut close, and solid and sound in every way.

Hon. Mr. HOARD.—I would like to ask what it is, in your estimation, that causes that fine cracking?

Mr. ROBERTSON.—Well, it is a most important question, and I do not know that I am able to answer it with perfect confidence that I am right, but I can answer to a certain extent what helps to make the cheese crack. If you use too little rennet in setting your curd you will always have a cheese that has a tendency to be a little long in the fibre. One man, who told me he was troubled with his cheese cracking, said he used 2½ lb. of rennet, and I said "I would just double it and use 5 lb, but you are perfectly safe in using another pound, or in using 3 lb. anyway," and after doing that he was not troubled again. I know if you don't use plenty of rennet you will always have a cheese that is liable to crack when exposed to the air.

Hon. Mr. HOARD.—I want to know if you do not think they crack because they have been dried out?

Mr. ROBERTSON.—If they dry out it is because they never had enough contracting power from the use of rennet. My experience is that if you use little rennet you will always have a cheese that has a tender body, rather a weak body, and a different kind of a weak body than a cheese that has plenty of rennet but not enough salt.

Hon. Mr. HOARD.—It seems to me there is another line of thought of some service in that connection. I don't know but you may be right, but it seems to me as if those cheese were season checking; they shrink because they lose moisture.

Mr. ROBERTSON.—The cheese I was speaking of began to crack almost as soon as they were put on the shelves.

Hon. Mr. HOARD.—You state that down the face of the cut they checked and dried out. Now, I have discovered that a skim-milk cheese will always check more than one that has plenty of fat. Then the more fat there is in the milk the less rapidly the cheese dries out. The necessary moisture is retained by the aid of the fat, and the two operate together and keep the texture closed. That has been my observation, and I want to know whether there was not a deficiency of fat in your cheese the past summer? What was the state of the pasture? Did you have considerable rain?

Mr. ROBERTSON.—Yes.

Hon. Mr. HOARD.—Well, now you would have less solids in your grass. As a rule might it not have been the case that your milk ran a little lower all through last summer?

Mr. CASSWELL.—I would like to ask one question. With your experience in the Old Country, did you use more rennet there than here?

Mr. ROBERTSON.—We used more rennet, but another thing you have to take into consideration is that we set lower.

Mr. CASSWELL said it was the feeling of the meeting that Mr. Robertson's son, who had been an instructor in Scotland during the past season, should get up and give his experience to the Convention. The question is that the cheese dries out very much here. It is a disgrace to put cheese on the counter, which cracks all over its face in three days. I want to ask young Mr. Robertson, did they use more or less rennet in Scotland during the past years than we do.

Mr. ROBERTSON, jr.—Just about the same quantity.

Mr. CASSWELL.—Then I want to know why it is that the Scotch and English cheese don't crack and that Canadian cheese do, and that when you go to a store in the old country and get a piece of cheese and take it home and toast it you can leave it until cold and it is nice and soft; but in Canada if you toast a piece of cheese it is soft and nice for a few moments, but after it dries it is as tough as a piece of leather?

Mr. ROBERTSON, jr.—I find a great number of cheese do crack in both cases.

Mr. CASSWELL.—When all the cream is supposed to be left in?

Mr. ROBERTSON, jr.—No; when all the cream is left in they do not. But I think too much of the moisture is gone in cheese of the description of which you speak. You will find it invariably crack when the milk has been skimmed. Then, when cheese is cut it is always more or less apt to lose moisture. Too much moisture does evaporate in this way.

A VOICE.—Don't you think it goes too cold to press? I have noticed in the factories checks in the side, and in most cases they have acknowledged that it got too cold to press that day. Don't you think the temperature regulates the moistness of the cheese?

Mr. ROBERTSON, sr.—The handling has a great deal to do with the moisture.

A VOICE.—I think too high heating has something to do with the cracking.

Mr. ROBERTSON, sr.—Governor Hoard says skim-milk cheese always does crack.

Hon. Mr. HOARD.—That the presence of fat hinders evaporation.

Mr. ROBERTSON, sr.—That is one point on which he is perfectly correct, but one reason I claim why cheese gets short and cracky is because the milk is too old and too far developed and comparatively acidy when made up. I have seen skim-cheese that instead of cracking or being tender were thought tough in the hide. There are other things which will make cracky cheese besides that; and here is one point I want to get you at, that when you try experiments only try one thing at a time. There are a great many cheesemakers who will try two things at a time. If a cheesemaker is making too sweet he will ripen more and get more acid and add a little more salt and go a little too far the other way, whereas he might have found out what was wrong by trying only one thing. The next point I wish to mention is that in our cheese there was a lack of that creamy, pure, nice flavor which some people call the "rosy flavor," which is so seldom secured in Canada during the first three or four months of the season. I thought that was just what put our price below the English and Scotch cheddars. Now, apart from that, I will give you one reason which, I think, has a great deal to do with cheese cracking when it is cut. As a rule during a good part of our season of making you are troubled here with gassy curds. I never saw a gassy curd all the time I made cheese in Scotland, during thirteen or fourteen years. They tell me they have it there occasionally a little. If you have a gassy curd you are under the painful necessity of treating it in a different

way than an ordinary curd. It has to get more working up, and has to be turned oftener, and for that very reason the curd is drier and stiffer and harder, and it would not hang together in a solid mass if it got less handling. Now, if we could avoid that and get the flavor that the Englishmen want and give the cheese the style of appearance they ought to have we would be on a level with them on the market. How are we to attain that? What steps are we to take in order to reach that point? You have had the subject of dairy schools brought to your notice. So far as instruction and inspection and dairy schools are concerned I think "both would be best." But one difficulty to my mind with the dairy school is that we cheesemakers, under present circumstances, and with the demands that are now made upon us, want something that will help us up more quickly than the dairy schools will do. We want something that will help us this coming summer; we want something that will enlighten and enliven our cheesemakers at once. Now, what is the best thing to do.

Mr. Casswell—Send good milk to the factory.

Mr. Robertson—Well, that is all right. We have been trying to get cheesemakers to make each cheese factory like a little dairy school, but we know the effects of this. During my experience last summer I found 100 out of 140 samples of milk watered. Then I found 4 samples out of every 100 some how or other short of cream. Now, that is not a great many, but still 4 in 100 is always something and it is tending in the wrong direction. You are able already to judge as to the usefulness of instructors and inspectors, and that is why we want to bring these things before you. We don't want to force anything upon any man, but we want you to judge from past experience what has been the benefit to you of this system of instruction and inspection. We want to put it in this way: have you found that the testing of milk in the past has been of any benefit? and, along side of that, has the work of instruction, by which we endeavored to assist you, been of any benefit to you? It is just like this to my mind: if these two things have been of no avail in the past then we don't want them continued and we want something that will be a benefit. Now, I wish the meeting to answer these two questions.

Mr. Hopkins—I am not going to say but that the inspectors in the past have been of service, but I think they could have been a good deal more serviceable. I think I can tell where they failed in a great measure. We expected reports from those inspectors and the reports which they left us never proved satisfactory to us. They were never definite enough, so that the great difficulty was to base a case upon the reports that we might bring before the tribunals. The report was "Well, pretty fair," "Not so bad on the whole;" the milk was not "watered," or "skimmed."

Hon. Mr. Hoard—But you had no standard!

Mr. Hopkins—But we profess to have a standard.

Hon. Mr. Hoard—The measure of fat as a legal standard?

Several Voices—No, no.

Hon. Mr. Hoard—Consequently you are in a fog.

Mr. Casswell—Some of the reports were very definite, you must admit?

Mr. Hopkins—I say upon the whole they were not. I know that Mr. Robertson called on me and we had a meeting and a very good night of it. I believe perhaps in that way, the instructions might do good—by bringing before the patrons the necessity for cleanliness and the importance of taking care of milk—and I believe we did derive benefit in that way. But what I am speaking about is that we got into a fog when we undertook to bring people to time. In this vicinity the inspectors reported that there was such and such a percentage of watering and skimming, but when we came to think of prosecuting or getting remuneration for the loss we sustained we had to abandon all the cases. We have got to give an education to our patrons. We bought sixty aerators this year and we can hardly get the patrons to take these and put their milk through them. We have got to commence at the patrons themselves; show them the defects in a certain amount of milk which they give us. We can make prime cheese, of fine flavor, all equal aged cheese, if they give us equally aged milk in good condition.

Mr. Robertson—To bring my remarks to a close, in reply to what Mr. Hopkins has said, no doubt there is quite a lot of truth in it, but so far as my reports were concerned, I do not think I put my name to them, but I had figure for figure for what I said. It is true we must have perfectly pure milk to make perfect cheese. It is true what the Old Book says, "You cannot bring a clean thing out of an unclean." Now, while Mr. Hopkins has said that the reports were not very definite, I have also found boards of directors connected with cheese factories that were not very definite either. (Laughter.) I have left reports stating that milk had been watered 15 to 20 per cent. and that I could swear to it, but those men did not think it would be wise to stir up feeling in the neighborhood. (Laughter and applause.) In order to reach the farmers we want to get at the cheesemakers, and I only get the cheesemakers when I go to the factories. I can honestly say that, for the last fifteen years, with but one or two exceptions, I scarcely ever got an unkind word from a cheesemaker in Ontario, and I have found fault with them and lectured them, and have gone into the curing room and shown a cheesemaker the defects and told him how to avoid these, and the next time I went back he would take me by the hand like a gentleman and say, "I am glad you found fault." I don't believe there is a class of men under the canopy of heaven that are more interested in their business or would like to do right more than our Canadian cheese makers. Get them educated and let them talk these things over with the patrons. Then the next thing the cheesemakers should have is a great long sheet on which to keep a record of the milk and if any man brings tainted milk tell him it has got to go in the whey tank or home, and stick to it. Then you will get clean milk and a clean market and it will enrich you all round.

Mr. Casswell.—I understood you to say they welcomed you?

Mr. Robertson—They almost invariably did.

Mr. Casswell—Did not some of them "Go for you" and kick up a row when you told the truth?

Mr. Robertson—Mr. Casswell is at the wrong point. I was referring to cheesemakers, not to patrons or directors.

Hon. Mr. Hoard—I want to ask young Mr. Robertson a few questions which I think will throw a little light on Scotch cheesemaking. Do they have in Scotland this promiscuous way of bringing milk to a factory to be manufactured as we do here, or is it not true that the finest Scotch cheese are made in large dairies of 100 or 200 or 250 cows?

Mr. Robertson, jr.—The milk is produced on the one farm, but the cows range from 40 up to 240. I daresay a great many of them have about 80 cows.

Hon. Mr. Hoard—Does not that eradicate a certain factor of badness? They have the question of the milk production well condensed, have they not?

Mr. Robertson, jr.—Yes.

Hon. Mr. Hoard—Consequently they have no miscellaneous milk to deal with—as miscellaneous as the old woman said her descendants were. (Laughter.) She had four daughters and one married a darkey, another a Spaniard, another an Irishman, and the other somebody else—like enough a Yankee—and she said she had the "speckledest lot of grandchildren she ever did see." (Laughter.) Now, just stop a minute, you cheesemakers, and think a little. You have so miscellaneous a character of milk and men to deal with that that introduces a disturbing character in the final quality of the cheese. For instance, give me a 45 cow dairy and I control the milk, give me a 50 or 100 cow dairy, I can make finer cheese than I can if I am bothered with 50 or 100 dairies that I cannot control. Then I would like to know what is the ruling character of the water in Scotland. Is there a likelihood of their having purer water than we have here?

Mr. Robertson, jr.—Yes, I believe there is.

Hon. Mr. Hoard—There are less mud pools and dung holes, etc. Now that is a most important thing, for bad water has more to do with stinking flavors in milk

than anything you have to deal with. I have traced the taint in cheese from the factory to the pond hole where the cows stood in the summer time and drank the water contaminated by the droppings of manure and urine and everything else. If you examine that milk with the microscope you will find in it the same germs as in the water. Then show this to the owner of those cows and say to him that he is endangering everything. Now, that is one thing we ought to do in Wisconsin and Canada from firstly clear up to seventeenthly. Now, another thing. A young gentleman spoke about skimming, and said he saw in *Hoard's Dairyman* a recommendation to skim to some extent, because cheesemakers could not incorporate all the fat. Well, it is true they don't all the time; we may just as well take some of the blame to ourselves as be loading it on to some other body all the time. I often go into factories and see fat wasted even in handling poor milk when there is none of it to spare. I know it is hard to incorporate this matter, but it only requires skill. The point made in the *Dairyman* was this: We need a standard; every man is working unto himself. Suppose we put the standard at 40 per cent.; that will give you, allowing for wastage, about 35 per cent. of fat in every hundred pounds of cheese. That will make you a clean cheese if it is skilfully made. But we have here, for instance, the talk of more and better cows and incorporating more and richer milk. Now, the question is the matter of skilful making, for skill is money. Supposing I have milk brought to me that has six per cent. fat and it don't pay to incorporate more than four per cent. of the fat? That was the idea that was brought out in the *Dairyman* concerning this question of skimming—the question of taking the milk down to the standard. Another thing is the question of reaching these patrons. Let me suggest to you that we have got to reform our methods a little. Why don't we consider the cheese factory more of a dairy school than we have done? Why do we waste this whole winter doing nothing? There is a cheese factory, there is a curing room, there's a stove in it, there is an opportunity of getting the patrons together. Why don't we take advantage of these little school houses dotted all over Canada and the United States? Let me say it would be very foolish to have a school house and never get anyone into it. You are standing in your own light. You ought to get your patrons together. You ought to do something in this line to inculcate a taste for dairy reading and dairy study. You should call your patrons together to discuss this question. They don't believe what you say, I know they don't, for they tell me so. They say "Them cheese-making sharps, they talk a great deal, you know, but talk is cheap." Get these men together every winter, do it even in the cheese-making season, if you can. Discuss this question with them. Go to work and read out something yourself as to the effect of these things. Write to some one and ask him to send you a statement as to what is the effect of bad water upon the milk for cheese-making purposes. Those men are ignorant of the conditions of these matters, and you have done nothing although you are dealing with men who don't come to conventions and don't read dairy literature and don't make a study of these things. Why, it is a good deal as the boy said when his throat was swelled up, "The stomach was awful hungry for water, but the throat wouldn't let it get there." The market is hungry for good cheese, but ignorance won't let it get there. I believe that the system of inspection is a good one, but I want to tell you one thing, that in Canada you have not started right yet. In Wisconsin we have started right, but we want to make a little different change in the rightness of the right. We want a legal standard for fat in milk. We started at three per cent. because the farmers said "Deal with us gently." But now how simple is our work. Our dairy and food commissioner goes to a factory and takes samples of milk. The man that brings milk to the factory that has less than three per cent. of fat catches it. It does not depend on the directors or cheesemaker to enforce the law. The dairy and food commissioners make the law and enforce it. Now, you have a legal standard to start with. It is a great help in pushing things up. Let me show you: Some factory owners are contracting to return a pound of cheese for every ten pounds of milk.

Hon. Mr. ADAMS—They ought to be closed up.

Hon. M. HOARD—Why, they are out in pocket and everything else.

Mr. SYMINGTON—What is the standard for solids?

Hon. Mr. HOARD—We have no standard for solids, because no one can steal solids

Mr. SYMINGTON—Are the solids all there in poor milk?

Hon. Mr. HOARD—No, everything is low in poor milk.

A VOICE—What is your opinion of pooling milk and paying everyone according to the quantity of fat?

Hon. Mr. HOARD—Well, you are coming to it. It is fast coming here. We have got to it.

Mr. SYMINGTON—Would there not be less solids if there were 20 or 60 per cent. of water?

Hon. Mr. HOARD—There is 87 per cent. of water in milk.

Mr. SYMINGTON—What if there were 20 or 60 per cent. of water added beyond that?

Hon. Mr. HOARD—We are not busying ourselves with that at all, because whether a man waters the milk or not the value shows in the fat, and if he skims it shows in the fat. He cannot meddle with the milk in any way. If the cow herself skims the milk it shows in the fat. Now, we are coming to that point where we will take 4 per cent. as the standard, and by using this little Babcock extractor be able to say to A, "Your milk has just 4 per cent.—that is, 100 per cent., you shall receive your pay accordingly;" and another man whose milk tests 3.75 per cent. gets his pay according to that; and if the fat tests above the standard he will get his pay then also.

A VOICE—You are in butter-making?

Hon. Mr. HOARD—No, I am talking cheese-making.

Mr. HOPKINS—Supposing my milk tests 4 per cent. and the standard is 3 per cent. Well, I say I will add 20 per cent. water and then I will have the standard. You find out that I have watered my milk and yet you let me go Scot-free because my milk is richer than another man's and I have only watered it down to the standard.

Hon. Mr. HOARD—We have a law against watering milk, but you have always to catch your rabbit before you can roast him. However, we have a standard. It is *prima facie* evidence against a man if the milk falls below 3 per cent. without any other analysis at all. You see the advantage of it. It simplifies and facilitates prosecution, but if a man can be caught or found watering his milk he is liable to prosecution.

Mr. ROBERTSON—Supposing something occurred such as Mr. Hopkins referred to, and that a patron did skim or water his milk to bring it down in butter fat to a little above 3 per cent.?

Hon. Mr. HOARD—He has no business to skim or water it.

Mr. ROBERTSON—No, but what can you do?

Hon. Mr. HOARD—Well, he should not do it.

Mr. ROBERTSON—Would you allow it?

Hon. Mr. HOARD—I would, because you have established a system which leads to that very thing. A patron says, you are not doing him justice anyway and if you don't he will himself. You compel the man to pool upon an unjust standard and you have no right to compel him to accept the results of it.

Mr. ROBERTSON—Allow me to give you a note or two here to let you see the different range of milk in my own experience this last summer. The poorest sample which I got only had 1.40 per cent. of butter fat in it; the largest sample had 5.60, and the men who furnished these samples were allowed and did continue to receive pay at the same rate. The one man was a great loser and the other was getting a great deal more than his own.

Hon. Mr. HOARD—That is just a difference of 400 per cent.

Mr. ROBERTSON—I took the trouble to figure up all the tests I had made last summer, and the average of the whole of the tests I made—something near 4,000—was 4.1 per cent. for the whole season. The year before I tested something like 9,000 samples and the average was 4.8 per cent., so that the last summer, so far as I could judge, the milk showed a little less butter fat all through the season, until we came pretty near the middle of September, and then it struck up in some cases until October.

Hon. Mr. HOARD.—Well, that was a very good average, but I want to show you what this inspection has been doing. I tell you we had a foolish lot of cheesemakers who went into the business. They were seduced into it by the patrons. They went on cutting the sand from under their feet. There were those cheesemakers getting out of pocket until they were from $1,000 to $1,300 in debt. Finally they appealed to the Dairy Commissioner; he went and applied a test and found the quantity of butter far down to 2.50, and fined different patrons $30, $40 and $50. At once, within twenty-four hours, there was a marvellous reformation in the milk in the whole of the cheese factories. Now, we have your system of inspection borrowed from you. It has been doing our cheese a splendid amount of good. I believe that the work along this line is in the best possible shape. But you want good laws to underlie that system. There is nothing in the law that reinforces the pooling, and that is what we want to correct. I believe that the point we touched upon in the beginning is a very important one, with regard to the fat in the milk as regards the evaporation of the cheese. Now, to settle this, take a cheese that has 40 per cent. fat, made the same as another that has only 25 per cent., and see how much quicker the latter dries out. The fat does help to retain the moisture in your cheese, and the leaner your cheese is in fat I think it will show more of that feature of cracking as a rule. I think, my friends, coming back to that point of the reaching of the patrons, that the cheesemakers of every factory can well afford to take upon themselves, when they have more machinery and less labor than formerly, an effort to stir up their patrons. I can show you patrons in Wisconsin clear right up along side of the cheesemakers and buttermakers, who know just what the standard is and what they want to do. Now, it is a pleasure to do business with such men. To show you a little of the effect of this education upon your own business, in Chatauqua county there is an old German who has fifty creameries and 1,500 patrons, and he was talking about the education of those patrons. He said "The business is crumbling and what will I do?" I went home, and he wrote me a proposition. He said "I believe I will do something for these people. I find the difficuly is they are not posted on dairy thought. Thay have not been thinking or reading along those lines; will you send me so many copies of the DAIRYMAN for distribution among them; I think I will send these papers to the patrons of two or three creameries." He took them and tried that plan for a year. What is the result? He said it was worth hundred of dollars to them. They began to take an interest in their business, to take better care of their cows, to get a great deal more milk, and to make more money. He said to me "As a proposition it was the best thing I ever did." I am not saying this from the standpoint of advertising my business, for I furnished those papers for absolutely less than they cost me. I wanted to see what would be the effect of education upon the men who made the milk. Now they are holding their own meetings in the creameries, and there has been a progress among these people that is very favorable.

RESOLUTION REGARDING INSTRUCTORS.

Moved by J. S. Pearce, seconded by H. S. Lossee, and *resolved*, That this Convention heartily approves of the good work that has resulted from the employment by the Association of travelling instructors and inspectors, and recommends to the Government the desirability of making such financial provision as will enable the Association to carry on that work in a still more efficient and extended way. Carried.

Mr. HOPKINS—I just wish to have myself understood with regard to the remarks I made when on my feet before. I am not opposed to inspectors, but I believe the cheesemakers are quite competent, and I think where the reform should commence is that the

cheesemaker should test the milk. I think that meetings should be held in the factories to get the patrons acquainted with the nature of milk and that there should be a little combination among the cheesemakers. I would not have one combination for the county, because the factories are too far apart, but I say that the makers of four factories could combine, and let one of those makers be the leader and tell the best ideas in regard to the improvement of milk and the difficulties to contend with in its care. Have the cheesemaker inspect the milk. Then we want instructors to go from factory to factory, and where the cheesemaker has been a little wrong rectify his mistakes. An inspector can do more efficient work then, and he will not be kept at one factory all day. There is a difficulty about the inspector being the prosecutor. I have contended that the inspector should not be detained from other work in consequence of a prosecution. I think the patrons and the cheesemaker should attend to the prosecution. Then, I think every factory should be the same as a little school, as Mr. Hoard has said, where the cheesemaker will take the lead. Having got the inspection right, by every maker being able to inspect the milk, and the milk right, then we should have four or five men to go right through the factories and put the cheese right.

Mr. Casswell—Did I understand you to say the cheesemaker should be the prosecutor? Don't you think you would put the cheesemaker as a prosecutor in an invidious position? If the cheesemaker did his duty and inspected the milk as he ought, should it not be the managing director who should do the prosecuting, and not let all the blame fall on the poor cheesemaker? I may say that if the cheesemaker did the prosecuting he would soon be turned out, or else the patrons would not look at him.

Mr. Hopkins—I did not say that. Just allow me to correct myself. So far as the test is concerned, although the owner of a factory, or the managing director, may enter the case, you must certainly at all times depend upon the man that made the test for the evidence to convict the patron.

Mr. Casswell—But would the cheesemaker prosecute?

Mr. Hopkins—Well, he would really be the man who was prosecuting. You cannot get an inexperienced man to give evidence as to a test of milk. I would make the maker in every factory the prosecutor so far as the testing of milk goes. If necessary, you would simply furnish him with a subpœna as a witness.

Mr. Casswell—But you are well aware that where the inspector has written a letter to the directors showing adulteration they have not prosecuted. Now, I may say if they had taken up those cases and prosecuted the men they would have done the factory and cheese trade a great deal of good. I do not see that there is any use in the inspectors writing a report and then the directors declining to punish.

Mr. Hopkins—Well, we have punished men. We have gone as far as we possibly could.

Mr. Lossee, referring to the resolution which had been moved, said: I advocate these county conventions. When those interested in the business in a county act together they can lessen the cost of manufacturing. We know for one thing there are three or four milk routes on every concession. That ought not to be. If the factories and patrons would act together they could lessen the cost in this way very much.

Mr. Casswell—Did you, Mr. Hopkins, buy testing instruments for all your factories last spring?

Mr. Hopkins—Yes.

Mr. Casswell—Did they have a good effect or a bad effect?

Mr. Hopkins—I know they were very tardy about using the testers.

Mr. Casswell—Did you insist upon them being used or not?

Mr. Hopkins—We bought a tester and put in each factory and the cheesemaker was to test the milk.

Mr. Casswell—But did they do it?

Mr. HOPKINS—I know we found the instruments. Whether the cheesemaker did his duty or not I don't know.

Mr. CASSWELL—But did the directors do their duty if they did not insist upon the tests being used?

Mr. HOPKINS—Well, they passed a resolution demanding that it should be done. (Laughter.)

The Convention adjourned at 9.30 till Friday morning.

THE BANQUET.

A great many members, after the adjournment, repaired to the O'Neill House, where a banquet was given, jointly, by the Woodstock Town Council and Board of Trade in honor of the Association. His Worship, Mayor Douglas, presided, and the vice-chairs were occupied by Mr. J. M. Grant, president of the Board of Trade, and Mr. G. R. Patullo, county registrar, representing the school board.

THIRD DAY.—MORNING SESSION.

RESOLUTION RESPECTING INSPECTORS AND INSTRUCTORS.

The convention resumed at 10.30 on Friday, when Mr. HODGSON moved the following resolution, seconded by Mr. JAMES :

That this Convention desire the President and Directors of this Association to engage as soon as possible four (six if possible) competent cheese inspectors and instructors, such instructors to be engaged for the season, and being competent speakers, so as to attend the annual meetings of all factories possible, and giving the patrons of the factory any suggestions needed for the better improvement of our make of cheese.

Mr. Hodgson, speaking to his motion, said : I know from talking to Prof. Robertson that his idea is to have the inspectors engaged for the season. My idea is that if the patrons are met by a competent man every year so as to talk cheese over to them, we will get right at the commencement of our production. All heard last night what Governor Hoard said about the value of having meetings at the factories. I may state that the first meeting which I ever attended in this Western District was at the Sefton factory. A cheesemaker asked me to go down, and I went along with the reporter of the *Advertiser*, Mr. Thompson, and I think a great deal of good was done at that meeting. That is where really good work can be done. As to the last year we had no inspectors, and I thought I would give my ideas a practical effect in expressing the desire which I know has been felt over the whole section for their appointment this season. In the Belleville district, in some cases, this year, they have beaten you by a quarter of a cent per lb. Their cheese has been of a high quality, and I think mainly on account of employing inspectors. They have the same instructors year after year. The first year they may not be able to get acquainted with the workings of the different factories, but by two years work they get to know the factories better and do better work. As Prof. Robertson has said, I think the inspectors should be put under a close examination before being chosen, and by means of them I think you will get at the whole root of the evil in cheese making. You cannot crowd the English market out with the finest grade of cheese. What we want is uniformity, and I cannot see how dairy schools, or any system of schooling, can get uniformity of cheese outside of instructors ; because they go around among factories and see who is going forward and who is going backward, and bring those that are getting behind up to those in advance, and so secure a uniformity of good cheese.

Mr. JAMES JAMES (Nilestown).—The employment of inspectors, I believe, is a step in the right direction. I have been for a quarter of a century trying to agitate this thing, and I am very glad the step has been taken in this way. I am pleased to second Mr.

Hodgson's motion. It has come from the right place—from a gentleman like himself, who is a buyer and knows the benefits of the system of inspection and the requirements of the market. We cheesemakers cannot get the patrons to act. We claim we can make cheese as well as any makers, but the thing is to get the milk in the right shape from the patrons.

Mr. Thos. Lockhart (East Zorra):—Is the system of inspection going to be compulsory? Who supports the inspectors? Is it going to be done at the expense of the associaton or of the factories? Now, this gentleman (Mr. James) says he has been an advocate of inspection for a quarter of a century, but it is not very long since we had inspectors before.

Mr. James—I advocated the system before the inspectors were appointed at all.

Mr. Lockhart—Of course it has been acknowledged as a good thing to have inspectors. I am not a cheesemaker, but I am connected with a factory. So far, in the past, it has been voluntary on the part of the factory whether inspectors were employed or not. I suppose if they are appointed again only some factories will have them. If that is to be the case we cannot have uniformity. If it is going to be obligatory—if you clothe these inspectors with authority to visit these factories without invitation—then we might have uniformity. I suppose we could get an Act of Parliament to bring this about. We had one inspector before who if he did not do his work with a little more discretion in the future would not do much good. He came to the factory but did not complete his work. He made certain entries in his book implicating certain persons on one solitary test. These parties' names got out through the neighborhood, and several very respectable citizens vouched for their innocence in the matter. They got somewhat into disrepute in this way, and considerable feeling was aroused. In fact for a time I did not know whether the board was going to be indicted or not for it. I am afraid if the inspector had been in the vicinity then he would have got into trouble. Now, if you send an inspector around without consulting anybody he has certainly got to have a good deal of discretion or he is going to do harm instead of good. He is simply going to raise disturbance and impute improper things to certain parties. Taking a solitary case of poor milk, you know it may be accounted for on other lines than adulteration. If inspectors go to factories they ought to see that things are so managed that no one's character is blackened unjustly, because it sticks to a man, and certain parties will use it against him. I do not believe, however, that if we have a right class of cheesemakers w need inspectors; and I believe competition in trade will bring these to the front; and I still think cheesemakers are competent to do the work. I think the cheesemakers migh prosecute, from the fact that there are very few in any company who will resort to adulteration, and instead of making the cheesemakers unpopular it would make them popular. Speaking of the old inspectors, they are not more competent than some of ourselves. Some of our makers would not submit to their instruction very well. They feel they are competent.

Mr. Hodgson—If Prof. Robertson were here I think he would say that he wants inspectors, and I find the cheesemakers are the very ones who want the inspectors to go around to the factories. I think the board of directors we have appointed will see that they get good, sound, honorable men as instructors, and, therefore, in any such thing as interfering or disturbing the unanimity of the patrons, I think it is only borrowing trouble. If the men appointed are able to get at the source of trouble I think the makers will be only too glad.

Mr. Jones.—We wanted our cheesemaker to take it in his own hand to prosecute delinquents. He said, "No; I will if you pass a resolution instructing me to press the thing as far as the law will allow." We did so. A man who kept 9 cows we fined $25. Next month it happened again that he had been adulterating. He took off cream for butter. He acknowledged it the second month and had to pay $30. Our factory is not large, but we get good milk and can make the cheese.

The President.—It is not compulsory at all upon a factory to have an inspector. If they don't wish to have him they are not obliged to do so.

Mr. Fewster.—I do not think any good cheesemakers would object to having inspectors appointed. If so, let them speak.

Mr. Lossee.—There is no cheesemaker who would like to take that responsibility on himself. They are too glad to have some outside inspector inspect the milk, because they do not want to raise any disturbance themselves.

The motion was then carried.

DAIRY SCHOOLS.

Mr. Pearce.—I have another resolution which I think you will all agree with, with regard to following up this idea of Professor Robertson's :

Moved by J. S. Pearce, seconded by J. M. Butchart, and

Resolved.—That this association urge upon the Dominion Government the advantage and need for the extension of the work of the Dairy Commissioner by the establishment of branch dairy experimental stations, under the direct supervision of Professor Robertson, for the purpose of carrying on such investigation into the principles and practice of improved cheese and butter making during the winter season, by fitting up these stations for that purpose, in order to educate and induce the factories and farmers to go into this branch of industry.

Resolved further, that a copy of this resolution be forwarded to the Honorable Minister of Agriculture for the Dominion.

The resolution was carried.

Mr. John Robertson.—We hear it said sometimes that certain individuals have certain ideas always uppermost. and whatever they may talk about these things always come up. Well, I think if there is any one idea above another that has occupied my attention through all my life, it has been cheese ; and in connection with the resolutions that have now been passed, I think, there is a good deal of uncertainty about the purposes which both the dairy schools and the inspectors are expected to fulfil. The resolution, to my mind, puts the matter in its true light. It is not intended that the dairy school should be like a day school, where everybody might go to learn the business. They are simply to be experimental stations, where cheesemakers can learn a great many things that are still very dimly known, and many things that are not known at all, as to the character and chemical conditions which often arise in milk. They would simply be stations for experiment in all the unknown features of the business. That is very different from a dairy school where people are to go and learn their business. Now, the very discussion we had last night, about the various points of weakness, and the faults and what causes the faults, and what deteriorates the value of our cheese, shows the necessity for an experimental school. Then, as to the inspectors and instructors, the way they have been doing in Scotland is this : I think the government for the last two years paid one-half the expense of the society doing the dairy work. Then the members contribute so much, I think it is five shillings a year. They, the farmers who own the cows, are assessed about six cents per cow. You can easily see the correctness of the principle ; because, if a man had ten cows he would pay 30 pence, and if he had 20 he would pay 60 pence, and so on in proportion to the number of cows he kept. Now, you take an ordinary factory in this country, say one supplied by 500 cows, and if it was assessed at 3 cents per cow, that would be $15 which that factory would contribute, and the government grant added to it would be sufficient to pay for the oversight of that factory by a competent man as instructor and inspector during a season. I know that sometimes the factory owners and dairy farmers think $10, or $15, or $20 quite a lump of money ; but if you say to them, " Would you agree to assess yourselves at the rate of 2 or 3 cents for each cow whose milk goes to the factory," I do not think there would be half-a-dozen farmers in any neighborhood who would object. I would pay twice that my self if I was putting milk into a factory, just to know what my milk was doing, and to see that the milk was honestly managed all around.

Mr. Hodgson.—I would go strongly for making all the factories have the inspectors

Mr. Casswell—You cannot do that. We are not in Russia.

Mr. Hodgson, that is only a suggestion; but I certainly think the owners of every factory should see that if they do not allow the inspector to go to their factory they strike a blow at uniformity.

Mr. John Robertson.—There is quite a little truth in what Mr. Hodgson says, but I think the difficulty is one which time and experience would soon rectify. If you are so fortunate as to get the right men for inspectors and instructors they will in nine cases out of ten lift the factories under their supervision to a higher plane. There will be a uniformity in those cheese where the inspectors' services are regularly employed, that there will not be amongst the factories that do not take advantage of their services. The consequence will be, when it comes to a question of money value, the owners who do not at first employ the inspectors will then do so. It is sometimes difficult to know how to get at people's thoughts, but about the readiest way to get at my own, and it is probably about the readiest way to get at those of most people, is to get your hand into the pocket. In that way you will soon reach the brain. I believe it is as true in the cheese factory as in any business. There are some makers in the country that would be as good men and know as much as the instructors, but they are not available. I know men whom I could recommend as the very men to fill those positions if it would be any use, but you cannot get them. If a man is running a good factory and making fine cheese and his patrons and himself are working in harmony he has a permanent position and has got a sure income; and he is not going to leave it to take a position which is not quite so certain, nor so agreeable to himself. But the great idea of having instructors is to assist men in a friendly way who are not quite up to the top and to give them the benefit of further instruction and to encourage them in their arduous labour, and lift the men who are on the lower plane until we get them up to the top. All this cannot be done in a day. It took us six or seven years to lift our cheese up to near the price of Scotch cheese, six, eight or ten years ago. Now they have got beyond our reach again and it will take us maybe five or six years, with all our efforts, to reach them again, but it has to be done, although it will take a good deal of skill and brain work to do it; and neither brain power nor money power should be spared in doing it.

Mr. Hodgson.—I want to follow out the argument about this inspecting business. Who were the first last year? Were they not the persons who took advantage of this inspecting?

Mr. Casswell.—When Mr. Harris was employed we had a few applications for his services and we sent out notices that factorymen who required them would have to pay so much per day. What astonished me was that the factories which asked for the inspector were those which made the best cheese, and on account of the quality were able to obtain the best prices in the Old Country. In this section it is said the bulk of the cheese was not up to that in the northern section. They did not apply for the inspectors here. I think there were only eight factories here who applied and 48 or 49 up north. I know factories who stand above the average and need never offer their cheese in the market; and those factories were the first that applied for and got the services of the inspectors. It is said we ought not to charge the little factories as much as the big factories for inspector's services. It takes just as much time for the instructor to go to a little factory as a big one and teach the maker. Even if the inspectors did not do what they were expected to among the patrons the very fear that he was coming along made them give a better quality of milk. It is said the inspector should go to them in a friendly way. I don't want to be friendly with this class of people. I want to make it hot for them. If the inspectors had been a little more rigid here there would have been better results.

A Voice—Molasses catches more flies than vinegar.

Mr. Harris.—I think the inspectors generally carried their point.

Mr. James.—If the patrons would take it into their hands they could make it hot for the inspector.

Mr. Facey.—I propose that the inspectors should be Government officials.

Mr. CASSWELL.—I think if there was a Government analysis, so as to test the milk, there would be no difficulty with the inspectors. Mr. Ballantyne's law is a good one—if a man does wrong expel him. A man does not like to be expelled from a factory. What I got up to say is that we paid $149,000 a year for importing cheese just about the time reciprocity was broken off, and now we are exporting $9,000,000 worth. That does not amount to any thing in comparison with the agricultural interests connected with the dairy. We lose sight of the hog. There are a good many kinds of hogs, but I am speaking of the pig with four legs. (Laughter). The first result we get from the hog industry is the manure and the next is the money value of the hog itself, and I believe we would be astonished to know the amount of money that is raised in connection with the hog and the dairy. It must be something immense, and I wish we had some way of getting at the result. For instance, I went out to see a farmer in the neighborhood of Ingersoll. He had taken in a load of cheese and came home with another load. I asked him if he had brought back a load of cheese also. He said "I have brought back a load of hogs, and they are worth as much to me as cheese. I feed them and don't keep them shivering in the cold." He told me he had already realised $800 during the year from hogs, and had fifteen more to deliver and seventy more to winter over, all off his own farm.

Mr. LOCKHART.—How much grain did he buy?

Mr. CASSWELL.—I do not believe he bought a bushel. He is a man who knows how to make a dollar and how to feed off his own farm. It is Mr. John Holmes, of Dorchester. Now, I have been astonished at factory owners, many years ago especially. You generally found their pig pens on the side of a hill where there was a creek so that the manure from their pigs could be washed away to save the trouble of carting it out. I want to say, no manure is so valuable to the farm as hog manure.

DAIRY UTENSILS.

Mr. CASSWELL read the following report which was adopted:

To the President and Directors of Dairymen's Association:

GENTLEMEN,—The committee on Dairy Utensils beg to report as follows: We find on exhibition an aerator, sold by C. H. Slawson & Co., Ingersoll, which we highly recommend to the patrons of cheese factories. We also find a press and hoops made by R. Whitelaw, of Woodstock; and also cheese hoops made by C. Lewis, of Salford, well made and well adapted for the business. The milk tester, the invention of Dr. Babcock, of the University of Wisconsin, for the estimation of fat in milk, we would confidently recommend to the convention.

C. SCHRAGG,
E. HUNTER,
JOHN FULTON.

CLOSING PROCEEDINGS.

A resolution was passed, thanking Mr. W. H. Huston, Principal of Woodstock College, for the cordial invitation extended to the Association to visit that institution.

The CHAIRMAN then said: The time has now come when we must part I cannot allow the occasion to pass without thanking you very heartily for the orderly and business-like manner in which you have conducted your business. I may say I never had the honor of presiding over a meeting where the order has been better and where those present evidently had a greater determination to transact their business in a proper way, or to try by means of discussion to improve their position in life. I now bid you all good-bye, and hope to meet you another year.

The convention joined in singing "Auld Lang Syne," and then adjourned.

III.—CREAMERIES' ASSOCIATION OF ONTARIO.

OFFICERS FOR 1891.

President	D. Derbyshire, Brockville.
1st Vice-President	John Hannah, Seaforth.
2nd Vice-President	Aaron Wenger, Ayton.
Secretary-Treasurer	R. J. Graham, Belleville.

Directors:

Division No. 1.—John Croil, Aultsville.

Division No. 2.—Ira Morgan, Metcalfe.

Division No. 3.—T. J. Miller, Spencerville.

Division No. 4.—J. Sprague, Ameliasburg.

Division No. 5.—Robert Philp, Cadmus.

Division No. 6.—James Davies, Toronto.

Division No. 7.—David McCrae, Guelph.

Division No. 8.—W. G. Walton, Hamilton.

Division No. 9.—J. S. Pearce, London.

Division No. 10.—E. Miller, Parkhill.

Division No. 11.—Frank A. Walden, Ayton.

Division No. 12.—Arch. Wark, Wanstead.

Division No. 13.—J. N. Zinkann, Wellesley.

Executive Committee:

D. Derbyshire, John Hannah,

J. S. Pearce, Prof. Jas. W. Robertson.

LIST OF MEMBERS

FOR 1891.

Name.	Post Office.	Name.	Post Office.
Abrams & McLennan	Camerontown.	Johnston, Chas	Athens.
Aird, John	Seaforth.	Johnston, Geo. R	Athens.
Balkwell, Geo	Walkerton.	Johnston, David	Seaforth.
Bisnett, A. L	Blenheim.	Jordan, M	Seaforth
Brill, S. R	Tecswater.	Kendell, John	Cedar Springs.
Brown, Thos	Holstein.	Kinsey, S. V	Guelph.
Brubacher, W. H	St. Jacobs.	Knox, Robert	Harlock.
Caloren, Geo	Iroquois.	Lackner, J. L	Chesley.
Carmichael, Jas	Arva.	Laidlaw, Wm	Ayton.
Cheesman, Jas	Boston, Mass.	Lennie James	Guelph.
Collet, J. K	Wellesley.	Lindley, H.	Cedar Springs.
Cooper, C. R	Toronto.	*Live Stock Journal Co*	Toronto.
Croil, J. H	Aultsville.	Macfarlane, Thos.	Ottawa.
Crosby, John	Marden.	Malcolm, F. S.	Innerkip.
Davies, Jas	Toronto.	Miller, Jas	Spencerville.
Derbyshire, D	Brockville.	Miller, E	Parkhill.
Dom. Dairy Supply Co	Quebec.	Miller, Archie	Picton.
Eureka Salt Co.	New York.	Miller, T. J	Spencerville.
Fairly, J	Seaforth.	Morgan, Ira	Metcalfe.
Farmers' Advocate	London.	Moyer, M. (life member)	Toronto.
Fuller, V. E. (life member)	Hamilton.	McCartney, Hugh	Brucefield.
Gilchrist, Duncan	Arkell.	McLean, M. Y	Seaforth.
Gladstone, Wm	Owen Sound.	McFarlane, D	Aberfoyle.
Graham, R. J	Belleville.	McIntosh, Alex	Mosborough.
Gunn, Flavelle & Co	Toronto.	McKechnie, Hiram	Elmside.
Hannah, J	Seaforth.	McLennan, D. F	Camerontown.
Harcourt, Geo	O. A. C., Guelph.	McMillan, J., M.P	Constance.
Herbison, W	Clinton.	McPherson, Alex	Cedar Springs.
Hillborn, Isaac	Elmira.	McTavish, J	Seaforth.
Hughes, John	West Stockholm.	Pearce, J. S	London.
Hugh, Fred	Golden Lake.	Pilow, Joseph	Camerontown.
Hunt, Harry	Belleville.	Petrie, W. T	Holstein.

List of Members—*Continued.*

Name.	Post Office.	Name.	Post Office.
Philp, John	Dromore.	Stewart, Peter	Park Hill.
Philp, Robert	Cadmus.	Struthers, Jas	Owen Sound.
Ramsay, R. H	Toronto.	Swan Bros	Toronto.
Randal, David	Athens.	Taylor & Williamson	Cedar Springs.
Rodgers, T. C	Durham.	Walden, F. A	Ayton.
Roke, Henry J	Owen Sound.	Walton, W. G	Hamilton.
Ross, Jas. T	Seaforth.	Wark, Arch	Wanstead.
Rutherford, W. D	Iroquois.	Watt, Geo	Harlock.
Sloan, J. B	Leamington.	Wenger, A	Ayton.
Smith Bros.	Churchville.	Wilson, D. D	Seaforth.
Sprague, J	Ameliasburg.	Zinkann, J. N	Wellesley.
Sprague, Mark.	Ameliasburg.		

SIXTH ANNUAL CONVENTION

OF THE

CREAMERIES' ASSOCIATION OF ONTARIO.

The sixth annual convention of the Ontario Creameries' Association was held in the town hall, Berlin, on the 13th and 14th of January, 1891. The meetings were among the most successful yet held by the Association, both in point of attendance and in regard to the animated nature of the discussions which took place. The authorities of the town, through their chief magistrate, Mayor Jansen, who was assiduous in his attentions throughout, extended a cordial welcome to the Association, presenting the members formally and in felicitous terms with "the freedom of the town." In addition to addresses by prominent persons specially interested in the supporting of creameries and the manufacture of butter generally, speeches were made by the Hon. John Dryden, Minister of Agriculture, Mr. I. E. Bowman, M.P. for North Waterloo, Mr. E. W. B. Snyder, M.P.P. for the same place, Prof. Robertson, Dominion Dairy Commissioner, Mr. Thos. Macfarlane, Dominion Analyst, Mayor Jansen, as already indicated, and the Mayor-elect, Mr. J. M. Staebler. Through the kindness of Mayor Jansen the proceedings of the evening meeting on the 13th were interspersed with music furnished by a local orchestra and glee club, and on the morning of the 14th such members as desired to go were treated to a drive through the town and a visit to various factories and public institutions of interest.

PRESIDENT'S ADDRESS.

The president, Mr. D. Derbyshire, of Brockville, occupied the chair, and opened the convention with the following address:

I congratulate you on having this convention in such an enterprising town as Berlin. I thank you on behalf of the Association for the kind way we have been received. We hope to have a pleasant and profitable time, and to be able to take another step in advance of all our former efforts.

Our exhibit at the Industrial Exhibition, in September last, was the best ever made in the Dominion by far, and I would call your attention especially to the Ayton creamery. Mr. Wenger has been exceedingly enterprising in putting up his butter for local use. We should cultivate our home trade, and see that fancy butter is placed within the reach of all. I feel proud of the good work done by our secretary, Mr. Graham, and also by our inspector, Mr. Sprague.

The creamery business may be divided into two natural divisions, the men who produce the milk and the men who manufacture the butter. Both are equal partners in the business; both must be honest and skilful in doing their share of the work or failure in securing a good price and fair profit will be the result. Both are working to please,

not themselves, but a third party, the consumer. The kind of butter he wants, the flavor that suits him, must be the law that governs them. Therefore, as dairymen and creamerymen we have a common interest in throwing away all of our stubborn and foolish notions. We must measure everything we do by the market standard, or we will be punished by incurring loss rather than gaining profit.

As the dairyman produces the milk he is the first one to be considered. As "Hoard's Dairyman" very truthfully says, he is the real manufacturer of the butter; the creameryman only separates it from the milk, salts it, packs it, and sells it. I want every farmer who sends his milk to a creamery to take this thought in, and sleep with it, eat with it, and live by it as long as he has anything to do with a creamery. In the first place the farmer must produce good rich milk. He must think hard and long on this point. He must strive to improve the quality of his cows; he must constantly weed out the poor ones, breed in or buy better ones. He must do this for his own sake as well as the sake of the combined institution, the creamery. The biggest humbug on earth is the notion that the creamery patron can cheat the creamery with poor cows, bad water, irregular care, and not end in cheating himself the worst of any man in the lot. "As a man thinketh so is he." If he gives himself up to such a standard of thought, he will end in poverty and disgrace. Therefore as patrons we must have a good high standard, to measure ourselves by, for the sake of our own success. Every patron should strive, just as quickly as possible, to know what constitutes a good cow; how to breed her and how to care for her. The average patron shows just what he knows on this question, by the returns he gets from his cows. That tells the story and there is no way of dodging it Visit any creamery you choose in Canada or the United States, and you will find a few patrons who are getting fifty per cent. more from their cows than the great majority.

It will pay you to ask the question, "What manner of men are they?" For it is the man that makes the cow. Every time you will find that they do not belong to the great general average. They say it does not pay to breed and care for a cow as the average dairyman does. Invariably you will find they are making a study of their business. You will find them subscribing for the best dairy paper they can get, buying the best dairy sire they can find, stabling their cows in the most comfortable way for the sake of the cow, cutting their hay at the time it will make the most milk when fed, building a silo and storing up all the sweet succulent food their good sense can devise, feeding a good liberal grain ration every day, in short trying by every means in their power to become first-class profit-making dairymen of themselves. That kind of a patron will not allow his cows to drink foul, stinking water; he is intelligent enough to know that foul water makes foul milk, and poor butter. That kind of a patron is a "joy forever" to the creamery proprietor and a blessing to dairy progress among his neighbors. He is the kind of a man to learn from, for he is a student himself. I am sorry to say that such men are mighty scarce, but, my friends, they are the only men who really make a good profit. Every patron in Canada can become just such a patron if he will only have pluck and sense enough to adopt the same methods himself. Remember, the foundation of the whole business rests on the patron. If he is foolish, stupid, unthinking, and negligent, no power on earth can make the business profitable in its best sense to him. We read every day of creameries here and there failing, because they were established in communities of farmers who will not become intelligent enough to do their work so that profit can come out of it. W. D. Hoard, Fort Atkinson, Wis., editor of "Hoard's Dairyman" and also proprietor with his son of one of the finest creameries in Wisconsin, gives a clear illustration of the value of a good sound dairy education among patrons, for the sake of their own profit. He stated in our meeting a year ago that he had one patron with a herd of thirty-five cows to whom he paid in cash sixty-three dollars per cow, as the earnings of that herd for the year, besides returning to him all the skim milk. Another patron, with a herd of twenty cows, got only forty dollars each. The cost of keeping the first herd was forty dollars apiece, leaving twenty-three dollars profit per cow to pay for labor invested. The cost of keeping the second herd was about thirty dollars, leaving ten dollars to pay for labor invested. The first made his cows produce nearly six thousand pounds of milk each, and considered the skim-milk worth fifteen dollars per

cow. That is, he possessed intelligence enough to feed it so it would be worth that amount to him. It is doubtful if the second made his skim-milk worth to him more than five dollars per cow. There are thousands of such comparisons to be found in Canada to-day. The object of our Creameries' Association is to bring up this discouragingly low average, thereby benefiting ourselves and our country.

I am convinced more than ever that our creameries must turn their attention to the production of winter milk and butter. We are making butter in the summer when everybody is doing the same thing, hence prices are clean down below zero. I find that the most successful creameries in the United States are those which make the largest amount of butter in the winter. It is not a difficult thing for a farmer to change his herd over to a winter dairy, if he but once resolutely sets about it. The increased cost of keeping a cow in milk in winter is not fifteen per cent more than what is necessary to keep a dry cow as well as she ought to be kept if she is to do good work the next season. The profit on winter milk is over thirty per cent greater than is obtained on summer milk. The creamery can run just as well in winter as in summer, and if the farmer will provide warm, healthy stables, properly prepared food, such as ensilage and corn, he can in this way get much better pay for his time and labor.

Every creamery proprietor ought to consider that his creamery is a dairy school, and bring his patrons together several times a year to discuss all these questions that so vitally affect their mutual welfare, he ought to take advantage of every opportunity to disseminate useful dairy information among them. He must not forget that he owes a duty to the men who have trusted him, and he must discharge that duty to their benefit whenever possible. I wish it were possible to take the proprietor and patrons of every struggling creamery in the Dominion, and set them down by some of the most successful ones; they would learn more by comparison, in one day, of the true road to succes than they would get by grumbling, in ten years. We need more comparison. This convention is for getting you together so you may learn all you can by this method of comparison. I desire that you should ask questions, compare notes, and generally make yourselves at home. I believe the day is at hand when all milk delivered to creameries will have to be paid for by butter fat contained in it, which is the only fair way. Then every man will receive money according to skill exercised. It is certainly no injustice to any one to get pay for the butter contained in his milk. We know some that furnish milk with five per cent. butter fat, while others have only three per cent. in theirs. I want this fully discussed, because it must come into operation here. With all that has been said about making fine creamery butter, and all that has been said about the poor dairy butter, ninety seven per cent. of all the butter is still made on the farms, when we all know that creamery butter is worth four cents a pound more. We must change all these things, or else we will go to the wall. In short we must have better cows, better stables, better food, with a silo on every farm, better educated men, who are determined to push forward or sell out, because we cannot live the way things are going on. Let us be alive to the necessity of getting more and better knowledge, and have it said that we creamery men have not met in vain; that we are fully alive to our interests, and that we will commence another season's operations with renewed vigor. I thank you for your patient hearing. (Applause).

Mr. JOHN SPRAGUE, (Ameliasburg)—Do you recommend to the people of this country the idea, when our cheese factories are closed, of making butter in the same buildings. As already remarked, the country to-day seems to be flooded with a poor quality of butter. The price for dairy butter is only fourteen or fifteen cents a pound, while that of creamery in the wholesale market is twenty-three cents, and the idea strikes me that by adopting some method whereby we could put separators in our cheese factoriess in the autumn the milk could be gathered in say three days in the week through the cold season and we could make butter through the late fall and early spring and in fact all winter, and on account of this favorable season for shipping we could export large quantities of butter. This has occurred to me, and I think it is a matter that should be brought before the people of the country.

The PRESIDENT—I would say a large creamery was started near Athens, which is about sixteen miles from Brockville, on the Brockville and Westport road, this last year,

by Charles Johnston & Son, right in the heart of the finest dairy section in Canada, not that the soil is any better, but I believe that they put more skill into the business, and in the selection and stabling of the cow and get more money from her than in any other part of Ontario. They manufactured butter and put it up for local consumption, except about two hundred tubs that I shipped late on in the season. They sold it all through the summer for twenty-two cents. Then after the close of the season four cheese factories centred in his vicinity, the patrons of these, in place of furnishing milk to these factories just took the cream to the creamery. The result was that this factory was making ten pounds after the regular factory season closed for one it did before. So any one who had good sense enough to do so continued to furnish cream in this way, and yet there were right within the sound of the bell in Brockville, where we ought to be leading in dairy thought and everything else, men who would make butter and sell it in Brockville at sixteen cents a pound in the face of the fact that their neighbors were delivering it at the creamery to be made into butter which was selling at twenty-two cents. I offered Mr. Johnston twenty-two cents a pound for all he manufactured after the regular factory season and he made a large quantity and got his money for it. Now, it cost two and a half cents for manufacturing, and they did their own drawing. In other words, they got nineteen and a half cents and had no labor and received their skim-milk back, and at the same time the factory men made some money and that gave them some tone, because it put $100 in their pocket at the end of the season. Take every cheese factory section in Canada and the same thing could be done. Have one factory which is centrally located, put in a separator and make butter right along after the cheese season is closed and by squeezing the cows to get all the milk you possibly can out of them and building them up you will be doing a good thing for yourselves and your neighbors and your country, and will be saving a lot of money that is now literally wasted.

Mr. R. J. Graham, Secretary-Treasurer.—I would just say in regard to the Belleville section, that most of the cheese factories close the end of September, and after that the price of butter goes down in Belleville. I have been selling all season for twenty-two to twenty-four cents, but at the close of the season the price of dairy butter went down to fourteen cents and the consequence was that the Belleville market was flooded with number three butter at fourteen or fifteen cents a pound. Just outside Belleville there is a large cheese factory where they could make butter from the first of October throughout the winter. At present there are a great many patrons that have cows, and as the price of butter goes down after the factory closes they do not care for making butter in very large quantities as they have not the proper facilities and the consequence is that those cows are allowed to go dry for four or five months. If they could send their cream to a butter factory and get twenty cents a pound they could afford to feed their cows well. I think this thing could be adopted in all cheese factory sections. I hope and trust that in our section after this where there are three or four factories they will combine and one of them make butter of the milk product.

Mr. Macfarlane—Mr. President, you seem to be the object of all our questions and it has occurred to me to propound one, viz., as to what manner of men these were who could not manage their own business properly. It has occurred to me to ask when the dairymen about Berlin seem to take so very little interest in the business of the Association—judged by the number assembled—whether there are butter factories in this neighborhood and whether the proper relations of confidence exist between the two classes you have referred to, viz., those who produce the milk and those who work it up into butter. There is no doubt the farmers here are certainly intelligent, thrifty and wealthy and ought to understand their own business. They ought to be entrusted with the ability to make out of their land all they can, and the question arises whether they have the proper confidence in the people managing factories for them. We all know the thrifty character of the people of Denmark, where this whole matter has been worked through. The manner in which the Danes worked their factories I brought up at the last meeting of the Association at Seaforth and I tried to emphasise there the manner of their working. The result of all their experience is this, that they found the best system for butter factories to be that those supplying the milk should also be the proprietors of the factory and get

all and every advantage that the working up of the milk provided. They wanted in fact to get all the profit that was going from the beginning to the end. That they were able to do by the partnership system; that is to say that an equitable division of the profits was made with every supplier of milk to the exact extent of the number of his cows. This system I brought forward last year more for the purpose of bringing it before this Association, but it has occurred to me to ask whether such a system might not pe capable of gaining the confidence of the furnishers of milk in the neighborhood of Berlin, so that there might be a great deal more of it taken into the factory than seems to be the case at the present moment. I would like an expression of opinion from you as to whether that system would be likely to awaken more interest and get more patrons than the present system pursued in Western Ontario.

The PRESIDENT—Of course the experience that I have had would not exactly agree with that. We have had what we call union cheese factories in our vicinity and invariably they have not been successful—not for want of patronage, but it seemed to be everybody's business and nobody cared to touch it. My idea is that a creamery, managed by some skilful hand who has an interest in the business, as well as in the money invested, is more likely to exercise the greatest skill possible, to get the best patronage, to handle his creamery in the best way, and make it successful for himself and his neighbors. That is what I desired to deal with more fully in my address, that is the idea of the patron running the cow ten and a half months in the year, so that she will know that she is constructed on purpose to give milk and will keep right on giving it. You know that if one of your neighbors begins to play a game of pool every day that practice grows on him until he is perfectly worthless as a farmer. Now, what we want is to to take the cow; she begins to think if she is not milked right on in the fall that she has done her work inside of four and a half months; and she will dry up at the same time next fall, but those who have practically taken hold of the matter—I refer to Bissell and MacCrae—and watched and weighed their milk, have been successful because they have milked their cows right on. These are not thoroughbred cows, but half Holstein, and they have been milking them ten and a half months. The very first year by breeding and care they got a heifer to give twice as much milk as her mother did at her best. The man makes the cow, and it ought to be the greatest study and desire of everyone to see his own idea expressed in the cow and her capacity for giving milk.

His Worship, Mayor Jansen, who had come into the hall at this point, took the platform and said he desired to extend to the Association a cordial welcome to Berlin, and to present the members with the freedom of the town.

The President on behalf of the Association replied, thanking his worship most heartily for the cordial welcome he had extended, and assuring him that it was exactly what they expected to receive in such an enterprising place as Berlin.

Mr. John HANNAH (Seaforth) resumed the discussion on the President's address: I would say as to the advisability of adopting the system of Denmark—of co-operation or partnership—that I think there are a few difficulties in the way. I do not know what the general intelligence is in Denmark, but I know in Canada and Western Ontario it is a little difficult to get farmers to go into any partnership I know that they are doing it in the cheese factory, but looking back to the early days of the cheese factory system it was nearly all done by private individuals, such as Mr. Ballantyne, Mr. Farrington and Mr. Lossee; and that system was worked up and all the difficulties overcome before co-operation took place. Of course there is a great deal to do in getting the farmers to take part in the creameries. I think where joint stock companies have been successful there has been one moving spirit that has done the principal part of the work. That is the position I think you will find it in at the present time in Western Ontario. After this stage is passed I dare say it is quite possible to run on the co-operative or partnership system, and I think in the majority of instances when the farmers get so far educated it is perhaps the best way; but in the early stages when everything is in doubt, when they don't know whether it is to be successful or not, it is impossible to get them to form together and stick together. I am very much pleased with the points brought out in the President's speech. I think all the work we will be able to accomplish has been foreshadowed in this masterly address.

Some of the points alone would form the subjects of discussion sufficient to engage the whole of our time. Take for instance the treatment of cows. There is no doubt a great lack of knowledge with regard to that. The President spoke of patrons that are only getting $14 from a cow throughout the season. There is no money in that and these are the hardest kind of patrons to give satisfaction to. It is the poor patrons, it is the parties that are making the poorest returns from the cow, that are dissatisfied. You cannot satisfy these men when they are only getting $14 per cow and every cow will eat $10 worth of hay in three months. Now, if this Creameries' Association, by its meeting here can do anything towards weeding out that class of patrons it will be quite a godsend to the creamery: and I think those are points that want to be looked to by farmers particularly. By comparison of their returns from the creamery with those made by making the butter themselves you can get them to come, but sometimes we have almost to try and shield the returns of some patrons from themselves, or else they would say the factory was trying to cheat them, or taking from one and giving to another, but it will have to be told and seen in the end.

The PRESIDENT, appointed His Worship the Mayor, Mr. Wenger and Mr. Moyer a local committee to arrange a programme for the speakers during the convention.

Mr. MOYER—The idea was suggested of turning cheese factories into butter factories in winter. I have always been a strong supporter of the creamery business, and I am afraid that would not do justice to the creameries. We all know that milk from grass in the summer is better than that from feed in winter, and I think in this way you will never establish a reputation for butter on a level with cheese. It will lead people to go into the cheese business in summer altogether. The President referred to the inferior butter we get. He should be very careful in talking about that point, because he knows that nobody makes it. (Laughter). I have had a good deal of experience in running a creamery, and I have always been of the opinion that a creamery business should be run by some enterprising person instead of by co-operation. I know I am not backed up in this altogether, but experience teaches it. Here is a creamery which has been run in this county by an incorporated company, and it has just been sold out to an individual. I think it is settled that the creamery must be run on the same basis as any other business. We would laugh at a farmer grinding wheat and taking flour to the market in order to get the most out of it. If a man puts his whole time into his business he is more likely to pay attention to the details. Everybody's business is nobody's business. I never saw a creamery operated by farmers from its start. After it had been got into good shape by some individual I have seen the factory taken over by the farmers, but it generally stood there; it did not make any progress.

The PRESIDENT—I think Mr. Moyer has made a small mistake with regard to the cheese factories. My idea was that we should extend the operations of our creameries as far as possible for the whole year, but in sections where cheese is now manufactured I believe we should start a separator in the best one of four factories, to continue to get all this milk together and manufacture butter out of the cream of these parties whose milk had made cheese all the rest of the year. I would not interfere with our creameries. While ninety-seven per cent. of the butter is made by the farmers, our reputation will never be better than at the present time.

Mr. MACFARLANE—I would like to say, in regard to the question of co-operation, it seems to me I have been fairly sat upon. I certainly do not see any prospect of the adoption of that system in Canada. I should like merely to ask those who are interested in this question to read what has been stated on the subject at the last meeting of this Association, and gave due weight to the facts and figures gained in Denmark. If they do not get any argument to convince them of the advantages of the co-operative system they may perhaps get at a great many that will assist them in ordinary business.

Mr. GRAHAM—Just before closing I would like to add a word or two on this subject. The largest cheese factory in eastern Ontario, which has been twenty-five years in operation, was this last fall sold to a private individual. The reason was that right on the same street was a factory built by a private individual, and the man that run the factory paid $5.50 per standard of three thousand pounds of milk more than the factory run

on the co-operative system. In our county, of sixty factories about one-third were run by private individuals, and I gave this as an instance showing that the factories run in that way paid more.

The convention then adjourned till 2 o'clock.

AFTERNOON SESSION.

The members having re-assembled at 2 o'clock the President called attention to some exhibits made by E. J. White & Co, of Belleville, in the shape of butter boxes, adapted for the local trade and suitable for holding from one pound up to ten pounds, and manufactured of wood with paraffine lining, which is caculated to keep the butter pure and free from the taste of the wood and exposure to the air.

COMMITTEES.

The following committees were then struck :
Order of Business—Messrs. A. Wenger, M. Moyer, and Mayor Jansen.
Nominations—Messrs. A. Wenger, J. Hannah, R. J. Graham, and J. Sprague.
Dairy Utensils—Messrs. M. Moyer, E. Miller, and M. Sprague.
Resolutions—Prof. Robertson, Messrs. D. Derbyshire, and P. E. W. Moyer.
Finance—Messrs. M. Moyer, J. H. Croil, and Mayor Jansen.
Legislation—Prof. Robertson, Messrs. M. Moyer and D. Derbyshire.

FERTILISERS.

Mr. Thomas Macfarlane, Dominion Analyst, Ottawa, being called upon, was received with applause. He said : At the last meeting of the Association in Seaforth he had read a paper full of facts and figures, but observing that an address seemed to receive more apprehension he now undertook to speak to them without notes, although he felt pretty much like a man handling a new horse, not being very sure whether the result was going to be a break-down or a runaway. However, I will start to give you a talk which may interest those who usually come to such meetings as this. On former occasions I have brought before you subjects more immediately connected with the testing of milk and the manufacture of butter and cheese, but as our worthy President said this morning, the matters that come before you for consideration can be divided into two classes ; those which concern the manufacture of butter and cheese, and those which concern the production of the raw material, namely, the milk. He stated that matter very well, and my subject on this occasion shall refer more to the production of milk than the manufacture of butter or cheese. The manner in which cows should be treated, the proper food for them and many others, are subjects of great importance in dairying, but I would go deeper down and say that a farm in good heart ought to be considered to be quite as necessary for the cheap production of milk. A good farm ought to be like an account in a bank, or rather like capital laid out at interest ; it should be able to support the farmer from the interest alone, and the capital—that is to say the richness of the oil—ought to remain unimpaired. Connected with this very matter is the question of artificial manure (fertilisers) with which we in Ottawa, especially in my branch, have a great deal to do. Now, I am not here for the purpose of advocating the use of artificial manures ; certainly not until the farmers are better aware of how to take advantage of the natural manures on their farms. Artificial manures I consider to be very much of a nature parallel to medicine. The doctor when called in merely uses medicine to assist nature. He does not expect that his patient is going to fatten on it.

So it is with fertilisers ; these are only of use to the farmers for the purpose of helping nature in her efforts to feed the plant. Now, besides having to do very considerably in the Laboratory branch at Ottawa with the testing of food and other preparations—milk included—we have also to do with the analysis of these same fertilisers, and in doing our duty with regard to them, in examining them and finding out all that is possible to know about them, in order to be in a position to advise other people concerning their manufacture and use, we have very frequently to post ourselves with regard to what is doing in connection with them in other countries. We think this is advisable ; we have to do it ; it is part of our business ; and in thus studying what takes place in other countries and in reading the journals published in other countries in regard to the application of these fertilisers, and in regard to agriculture and its interests generally, we acquire a great deal of information which the ordinary farmer or dairyman cannot be expected to collect, and it is for us who are in the position of being able to gain this information and who are the servants of the Government and the people to place ourselves at the disposal of the people and lay that information before them. It is this I wish to do on the present occasion, and I may mention that I am not here of my own motion. When asked by the secretary of this Association to attend the present convention I applied to the Hon. Mr. Costigan, Minister of Inland Revenue, for permission to do so, which was readily granted, and it is by his consent that I am able to be here and give you the benefit of any information I have gained in the execution of my duties. I shall not say very much in regard to the operation of the Fertilisers' Act in Canada, although I am ready to answer any questions any person may ask on that subject ; I shall merely advert to the fertilising constituents which are present in all those artificial manures and their values, in order that if possible, farmers and dairymen may realise the actual market value of substances that they are daily handling, and in order that they may learn to appreciate these. There are materials passing through their hands, sometimes carefully, sometimes carelessly, which if they had to buy in the open market would cost them large sums of money. I may mention that according to the operation of the Fertilisers' Act, passed at the last session of parliament, we are now bound to give in our reports a statement of the relative value of each of these fertilisers for the information of the public. Now, this value has to be calculated per ton for all fiertilisers offered for sale in Canada, and it is computed by taking the quantity of fertilising constituents in pounds which they contain, and multiplying it by their ordinary prices in the market. The valuable constituents are three —potash, phosphoric acid, and nitrogen. That is not a large number to remember, and I shall not trouble you very much with two of them. However, I would like you to remember that the relative values are something like this: phosphoric acid is about twice the value of potash, and nitrogen twice the value of phosphoric acid. That is to say, if potash stood at four cents per pound you would have to pay eight cents per pound for phosphoric acid and sixteen cents per pound for nitrogen. These are very nearly the prices which the farmer has to pay if he wishes to buy in the open market such fertilising materials. Nitrogen is the most costly, and it is about that particular fertilising ingredient that I wish to talk to-day, because, while it is of great interest for the general farmer, it is also of great interest to the dairyman. Now, with regard to this one element, nitrogen, you will all say, "Well, what is this nitrogen ?" I answer, it is a very important constituent in foods and fodders, and especially in those foods which contribute towards the formation of blood and muscle. It is one of the essential constituents of casein, of cheese, in which you are all interested. It is not, I am glad to say, present in butter at all. Therefore, if you produce butter and sell it off your farms you may pride yourselves on one thing, that you are not selling away any nitrogen, and, therefore, the farmer who sells only butter is certainly not impoverishing his farm. But I want to call your attention more particularly to a source of nitrogen which the farmer, if he is aware of its existence, certainly does not take advantage of. Like the famous McGinty, we live at the bottom of a sea of nitrogen. The atmosphere that we live in and breathe consists, four-fifths of it, of nitrogen. Now, that may be very strange to you, that four-fifths of such a common thing as air consists of a substance worth as much as sixteen or seventeen cents a pound—worth as much as ordinary butter in your

market. Therefore, you will see that it is a very great advantage to get hold of that element in some way or other, and when you have got hold of it to keep it. Well, we have got it surrounding us everywhere. It there were any school boy here I am sure he could tell me the pressure of the atmosphere upon the earth's surface. I dare say many here know that it presses at the rate of fifteen pounds on every square inch. It follows then that if there are fifteen pounds of air pressing upon one square inch, and if four fifths of the atmosphere consists of nitrogen, there must be twelve pounds of that nitrogen resting upon every square inch of our earth's area. Twelve pounds of nitrogen at seventeen cents per pound make $2 04, and this is the value of the nitrogen that lies upon each square inch of the earth's surface. What does that come to per square foot? There are 144 square inches in a foot, which makes about $238.00 worth of nitrogen resting upon every square foot of the earth's surface. If we went on calculating in this way we would come to see that on a hundred acres the amount is something over one thousand millions of dollars. That would be a very valuable farm indeed if the owner could convert the nitrogen resting on it into pounds, shillings and pence. If he could convert a very small fraction of it into cash he would be a very rich man. I mention this to show that nitrogen has a very great value for the farmer or any one who can fix it. This fixation of nitrogen has long attracted the attention of chemists. They have for years back—half a century at least—been exerting all their ability to convert that nitrogen of the atmosphere into something they could sell. They have been trying to get it converted into cyanogen, which makes up a great part of the substance known as Prussian blue. They have also tried to get it used in making saltpetre. They have also been trying to get it converted into ammonia in order that they might realise something handsome from the enormous wealth of nitrogen stored in the atmosphere. They have been able to do it to a certain extent but never in such a way as to pay them for the attempt; and yet all this while there is one man, I don't know whether he is a tradesman or a professional man, to whom it is given to convert the nitrogen of the atmosphere into something of value, and that man is the farmer.

Mr. DERBYSHIRE.—Call him a professional man.

Mr. MACFARLANE—Well, when we consider all the advantages at his disposal and the skill required to take advantage of them, his ought to be the first of the professions. But to return to our subject. Priestly was, I think, the first to state that certain plants have the faculty of being able to take nitrogen from the atmosphere and fix it in themselves and in the soils connected with them. This has long been maintained, but only within the last ten years has it been proved to the satisfaction of every man, scientific farmers and scientists included, to be the case. It is now a well established scientific fact that plants of a certain class, which the farmers raise every year, have the faculty of converting nitrogen into a shape in which it is realisable at the rate of seventeen cents per pound. It is well known that such plants as pease, beans, lentels, lucerne, vetches, clover, lupins and others, have the faculty of enriching the soil. These plants do so because they have the property of fixing nitrogen. If you choose to raise grain or corn they cannot thus procure their nitrogen from the atmosphere. It has got to be supplied to them in the shape of manure if they are to be able to take advantage of it, but those other plants or crops that I have mentioned, the pease, the beans, the clover, etc., or what the botanist calls the *leguminosæ*, have the property of being able to take that nitrogen from the atmosphere and appropriate it to themselves. As I said before, the fact has long been known or suspected, but it was not until quite recently that a certain farmer, who was not a scientist, named Schultz, who possessed a farm called Lupitz, in the north of Germany, went to work and proved it practically and gave such an explanation of what took place as excited the attention of the scientific men of his country, and then scientific controversy began, and it has rained pamphlets on this subject ever since. I will try to explain what it was that farmer Schultz did, and I will relate the facts as they are given by thoroughly reliable practical men. Mr. Schultz owned, or bought, or acquired a farm in north Germany, which consisted almost wholly of a light sandy soil, and I suppose you all know how hard it is to make money on a farm of that description. It was so poor that he could not raise anything to advantage. He tried raising a fodder which is commonly grown in the north of

Germany, namely, lupins. He could not even raise them at a profit. He was able, by spending money for large quantities of artificial manure, to raise something, but not to pay. Just about the same time as he was struggling with his difficulties, the salt mines of Stras-furt were discovered in North Germany. You are all aware that though the bore-holes were sunk to obtain rock salt, they discovered, besides it, other minerals containing potash. This was an accidental discovery. It was made about the time that Schultz was engaged in working his farm. It was not long afterwards until shafts were sunk into the deposits, and various minerals and salts containing potash varying all the way from twelve to twenty per cent. in their natural state, were opened up. Mr. Schultz heard that they were of great value on account of their potash, agriculturally. He thought he would try them as a last resort. He purchased the quality known as kainite and used it at a rate of about something less than one hundred and fifty pounds per acre. He sowed it upon the land which was yielding lupins, and to his astonishment he got a larger crop than he expected, and more remunerative. He was able, by applying these potash salts alone, to get large crops of lupins and peas and beans and clover, at the same time, he applied no nitrogen. There was none present in his sandy soil, and yet the resulting crops were highly nitrogenous. He thus obtained a practical proof that these plants stole their nitrogen from the atmosphere. He proved further that by growing these leguminous plants he gave the grain crops which followed them in the rotation a supply of nitrogen which assisted their growth, and he had as large grain crops as his neighbors. He did not, in order to supply nitrogen for raising these grain crops, plough in the previous ones. He harvested his peas or clover and made use of them, and he found that the roots of those left in the ground contained sufficient nitrogen to sustain the grain crop afterwards. He characterised wheat, barley, oats, etc., as crops which consume nitrogen, and he characterised the clover crop and the crops that are analagous to it as those which collect the nitrogen. He therefore settled down to conducting his farm in this way, raising first the clover and pea and bean crops, etc, that were necessary for grain crops, and he succeeded perfectly. He found that by putting a grain crop after potatoes, for instance, he got no result at all without nitrogen, which cost him money, but if he sowed grain after the clover was off the ground he succeeded perfectly, and his rotation thereafter consisted in sowing first nitrogen collectors and the second year nitrogen consumers. In this way he was able to go on making his farm pay and enriching it at the same time. He happened to be a man of considerable intelligence; he published the whole of these results, and ever since the discussion has been going on in Germany. The subject was taken up by two German professors whose business was that of agricultural chemists. Their names are Wagner and Hellriegel. Independently of each other they set to work to get the scientific demonstration of what Schultz had shown to be a fact, and carried on experiments underneath glass jars or domes on plots of ground, and in vessels resembling large flower-pots, but the particulars of these I need not give and it is quite sufficient to say that these proved to the satisfaction of scientific men in Germany and elsewhere that it is possible for the farmer to acquire nitrogen from the atmosphere and that he does not require to purchase it from any other source. He can get that which is an essential food for wheat, barley, etc, by the intervention of such crops as I have mentioned. I suppose it will be said that there is nothing new in this, that many farmers here and there have done the same thing. It is well known that clover has an advantageous effect, and possibly also some of you may have had experience of that sort; but it is one thing to have the experience and another to have the explanation as to the reason why the sowing of clover is to the farmer's great advantage. I believe that an explanation of the cause will come before him with redoubled force and induce him to widen his experience and take advantage of those circumstances of which he knows the effect has been demonstrated. He may follow Schultz' example and be perfectly sure that by employing the same means he will get the same results. Nature is the same everywhere, the same in Germany as here. At any rate, the atmosphere is the same and what they have taken out of the atmosphere in Germany may also be taken advantage of in Canada. Of course, in a new country you have to consider the climate, but in this matter I do not think it is neces

sary. It is simply necessary that the farmer should make up his mind to apply the same principles here that have been applied in Germay and elsewhere with great advantage. The chief thing is to remember that nitrogen is essential to the growing of his most valuable crops; that nitrogen to be presented to those crops directly in fertilisers will cost a large amount of money, seventeen cents a pound, but that you can acquire it from the atmosphere by growing in advance of the grain crop a clover or bean or pea crop, without its costing anything. Now, I think that it is, perhaps, as well not to occupy too much of your time in talking upon this subject without allowing some one else to get in a word edgeways, and I would much rather be questioned on the subject than go on saying over and over the same thing. I do not know whether I am preaching above the heads of my congregation or not, perhaps I have been preaching beneath the capacity of my audience. I am reminded by this of an incident which occurred in my own experience. I am a Scotchman and a member of a St. Andrew's Society, and on one occasion I got a letter from the secretary telling me that I was in arrears to the extent of seven or eight dollars. Well, I had not been in the place more than one or two years and I could not understand how I could be so much in arrears, and wrote to the secretary asking him information on the subject. He gave me an account showing that there was one dollar due when I lived in such and such a street, and one dollar when I lived in such another street, but I had never lived at any of those places, and so I wrote back to him to say that he had "got the wrang soo by the lug." (Laughter.) Now, this is not the joke. The joke is that the secretary did not understand and wrote back to ask me what I meant. (Laughter.) I give you that as an instance of preaching beneath the capacity of an audience.

Mr. Moses Moyer—Do I understand you to say that the fertility of the soil can be kept up by raising a crop of leguminous plants without supplying fertility by manure or in any other way?

Mr. Macfarlane—Yes, provided you supply the inorganic constituents; that is the result of the experience I have been speaking of. One particular element, nitrogen, can be supplied from the atmosphere in this way. But it is not thereby meant that nothing else is required for a particular plant. I have mentioned that potash and phosphoric acid are advantageous for the growth of most plants. They have got to be supplied. These the farmer must get and apply under certain circumstances and conditions, but I was going to call your attention to the fact that those are the cheapest among our fertilising materials. They cost you less money and you can very easily procure them. There is very little of these fertilisers sold in Canada compared with the population, and the reason is because manufacturers of the fertilisers are obliged to put in nitrogen at the cost of seventeen cents a pound to supply that which the farmer might himself procure. We will take, for instance, a compound fertiliser, that is to say, one that not only contains the inorganic constituents, potash and phosphoric acid, but nitrogen to such an extent as to be appreciated by the grain crops to which it is applied. That must usually amount to five per cent. to be effective at all. The manufacturer must buy dry dried blood or sulphate of ammonia, or nitrate of soda, in order that the nitrogen shall be supplied. We will take a fertiliser containing five per cent. of nitrogen. There are twenty hundred weight in a ton. That means that every ton must contain one hundred pounds of nitrogen. Well, one hundred pounds of nitrogen at sixteen or seventeen cents a pound increases the cost of a ton of these fertilisers by sixteen or seventeen dollars. It makes a great difference to the farmers whether the fertilisers cost twenty-six dollars or only ten dollars per ton. If the farmers would only do their duty, that is, take advantage of the natural store of nitrogen all around them in the atmosphere, they could very easily purchase fertilisers containing phosphoric acid and potash. Now, the fertilisers which Schultz supplied was one containing potash—principally kainite—and which was produced at a low price. Now, you take wood ashes; if to-day you want to buy wood ashes on account of the potash they contain, you will have to pay probably at the rate of six cents per pound for the potash. But the potash in such material as kainite probably does not cost more than two cents in Germany. Therefore, Schultz was able to use them in large quantities, and by growing leguminous plants was able to steal the nitrogen from the

atmosphere. Opinions may be divided as to how these plants really do this and why it is that grain crops cannot. It is, indeed, a very curious thing that barley or oats or corn have not this faculty, and the controversy is still raging as to the means by which the leguminous plants effect the transformation. People are now theorising and have called in the microbe to explain. Certainly scientific people who are bound to explain go to the roots of everything, have gone to the roots of pease, and found excresences on these roots and believe, that in these lies the machinery, whereby the transformation is effective. They say that the little bulbs on the roots are little houses in which dwell the microbes or bacilli by which the nitrogen is assimilated. I merely mention this point as the farthest that has been reached by Hellriegel in explaining how beans, pease, clover, etc., exert their power of taking from the air that material for the use of the farmer which costs him as much as he gets for his butter.

Mr. Moses Moyer.—This is certainly very interesting to me. Farmers here are in the habit of plowing down their clover. Do I understand you to mean that some nitrogen is stored in the roots?

Mr. Macfarlane—Yes, sir. That is certainly the result of Mr. Schultz's experience.

Mr. John Philp (Dromore.)—I had a field of clover and in the fall I was plowing it down when a neighbor came along and asked me what I was doing. I said "I am going to plow in this crop." "Well, he said, that is not giving the land a chance. Why, you have only meadowed it one year." I said "That is all right." The next season the same gentleman came along and I had a fine field of wheat there. He said "That is the best field of wheat I have seen." I just clapped the old man on the back and reminded him of what he said about not giving my land a chance. I said, "The cost of the clover seed would not be so great as the hire of a man to put on manure." I agree with the Professor's speech very much.

Mr. Samuel Hunter—I understand the Professor to say that there were several things requisite to enable the farmer to produce a good dairy product; amongst the first was a good fertile farm. I would ask if the best way of adding fertility is to commence dairying and especially winter dairying. Could a farm not be enriched in that way?

Mr. Macfarlane—I am much obliged to Mr. Philp, who has given practical reasons for agreeing with the theories I have brought forward. Mr. Hunter has adverted to something I proposed to go into after disposing of the first part of the subject. I did not, however, exactly understand his question.

The President—He wants to know if going into winter dairying and keeping more cows and raising less grain would not tend to enrich our soil and help the farmer to make more money for himself.

Mr. Macfarlane—I believe there is no doubt about that. I was going to say something about that in tracing the further history of nitrogen, and if no one has any further questions to ask just now about the fixation of nitrogen we shall go on and try to follow up this nitrogen. It is quite an interesting history. When a boy I used to read all sorts of trash and among other things something which is not trash, namely, the Waverley novels. One of them, called the "Fortunes of Nigel," I found very entertaining, but I now think that if farmers and other people properly studied the 'fortunes of nitrogen" it would probably result in their making their own fortunes. We will suppose by one means or another, but especially by stealing it from the atmosphere, the farmer has got the nitrogen lodged in the soil. Well, we will try and trace what becomes of this nitrogen. We will suppose you have raised, by means of nitrogen, a crop of clover and one of grain. Well, the grain you cut to realise on it. The nitrogen has found its way into the ears of the grain. It forms the most important constituent of the gluten contained in the grain, and that you want to sell off and convert into money. You are realising that which you took with the good permission of kind Dame Nature. Well, if you would go on in the same way and grow more grain you have got to produce more nitrogen on your farm or purchase it. You do otherwise with the clover. The clover is cut and taken into the barn and it is fed to the cattle along with other valuable fodder. Part of the nitrogen that is fed to the animals is used by them in order to build up their frames, their muscle, their flesh, and a certain portion of it passes unappropriated through the

body. A certain part of the phosphoric acid goes into the bone, and that along with some potash and nitrogen is contained in and sold with the animal, but the nitrogen thus sold is a very small fraction compared to that which passes through the animal. By far the greatest portion, at least 80 per cent is to be found in the manure that is collected in the manure heap or what I think the farmer should call his "treasury." Now, I must tell you that nitrogen is a very unstable element. It seems to unite with other elements under protest and is unfortunately always wishing to return to its original condition. It is always striving to outwit you, always striving to get back to the atmosphere again, and it will require all the intelligence of the farmer to retain it. There lies the art of the farmer. He must first catch it and then keep it. I am sorry that this is not very well attended to. The President gave you an instance of bad farming when speaking of wintering cattle in referring to the man who neglects his cows in winter. Well, you have got a parallel to that man in the farmer who pays no attention to his manure heap. Almost everywhere I have travelled in Ontario I have seen the manure thrown out and exposed to the winds and rains of heaven, and all the time the nitrogen is escaping. It is very sensitive, takes the huff easily, and if not fixed goes back to the air and careers over your head and laughs at your folly. By intelligent action the farmer can retain the nitrogen which he has acquired from the atmosphere. "Well," someone asks, "how are we to know when we are losing this nitrogen?" In the first place very many of you, I have no doubt, in going into a stable, more especially a horse stable, have often been met by a very pungent smell. What is that? It is called ammonia, and in that form the nitrogen is flying away from you. Then, in another part of the barn you will see trickling away from the manure heap or the stable a little brown stream of liquor. That is the nitrogen in company with the potash oozing away. These are the leaks that the farmer allows to go on in his establishment, and he must suffer from it. Just as great leaks take place there as if when taking sacks to the mill he allows the grain to trickle out on the road. There is no difficulty in preventing this nitrogen from running away. The smell I have spoken of can easily be prevented by means not at all new. It has been talked of for fifty years. Here in Ontario you have inexhaustible supplies of common land plaster. It is cheap enough; I do not believe it costs over six or seven dollars a ton. By simply sprinkling a little ground plaster in the stable under and behind the animals the smell disappears. The sulphuric acid of the plaster takes hold of the nitrogen and puts it into a condition in which it cannot possibly escape and it is swept away with the manure into the manure heap. Not only so, but the plaster has the faculty of preserving that manure better than you possibly could in any other way. I do not mean preserving it if it is thrown out of doors. It must be kept in a covered shed. To have manure exposed to the air simply shows an utter want of intelligence; the farmer who allows this is working against the interests of his own pocket. If it is thrown out of doors what happens? The first thing that happens in this climate is that you have got a layer on the ground and then comes a layer of snow. Then out comes another heap of manure and then snow again, and so the manure is kept in quite a cold, miserable condition and cannot ferment and get into the condition the plant likes. That is the first result. The second is this, that when that snow melts it simply dissolves out of the manure anything that is good. The ammonia and potash go in that way and the resulting manure is scarcely worth the trouble to you of carting out to the field. There is then a perfectly easy system whereby by the use of plaster and proper care valuable constituents once obtained can be retained in the manure heap. In answer to Mr. Hunter's question as to winter dairying, it may be said that is by far the most profitable system of using up farm produce. As I said before, at least 80 per cent. of the nitrogen of the fodder finds its way into the manure heap. If, however, you sell your milk to the cheese factory you are certainly taking away a large quantity of the nitrogen which you have acquired with so much trouble. The milk contains about four per cent. of albuminoids, mostly casein—the constituent containing the nitrogen and used in the manufacture of cheese—and when you sell away the milk to the cheese factory you sell away part of your nitrogen which you have obtained with so much trouble from the atmosphere. On the other hand, if you sell to the butter factory and so arrange that the skim-milk is returned to the farm to raise young

stock upon, you receive all the nitrogen back and it is replaced on the farm again. In that way, if you choose to get money by butter rather than by cheese, you do so much the more to keep your farm richer and in good heart. The butter contains no nitrogen, and if you take the proper means for fixing and keeping the nitrogen which are at your disposal by means of nitrogen collectors and land plaster, your farm must inevitably year by year be getting richer. I have only good words to say with regard to the keeping of stock and the getting of manure from it. My principal object was to show in addition that you could acquire more of this valuable stuff, nitrogen, by a certain course of cropping, and if adopted there is no question that the farm must increase its yield and get richer as time goes on. Much of what I have said today has been said before. It is thirty years since I first read that old old story as to the use of land plaster, in a book written by a German agriculturist, entitled "A pound of nitrogen for a penny." That book, published many years ago, gave actual, practical demonstration that by the use of plaster you could retain the nitrogen of barnyard manure. It is an old story, but, like many another story, it is none the worse for being twice told. I tell it again in the hope that some may believe it and endeavor to practice it. (Applause.)

The PRESIDENT—What Mr. Macfarlane really wants is that we should raise a great deal more to the acre; have more and better crops; feed more and better food to more and better cattle and realise more and better results from those cattle. I think it ought to be the aim of every dairyman to have a better dairy cow fed by better methods; utilising all those things which have been given for his benefit; feeding strong, healthy crops; feeding them to strong and healthy cattle, exactly adapted for making the best quality of cream suitable for manufacturing the finest quality of butter, and in this way making money for himself and being an honor to his neighborhood and his country. It is a great and worthy aim and one which will help to secure for man enlarged influence.

Mr. HUNTER—I think, if I understand the Professor, he is not an advocate of taking out the raw manure and spreading it on the land. I understand he prefers ripening it in a heap.

Mr. MACFARLANE—Yes, that is so far as my small experience goes. If carted straight out to the field the chances are greater for having it leached out by snow and rain. Of course, in that case the leaching is done on the land and the soluble matter is not quite lost if you get it at the place you want it. I know this, that when plaster is used in the stable and the manure is kept from being exposed to the atmosphere it benefits the manure very greatly. I have seen it dropped through a hole in the stable into a space below, and in fact that is a common custom which prevails in the province of Quebec. I do not know whether you will approve of that or not, but down there they set great store by it. We are in the habit of supposing that the French habitants have no great intelligence, but they have intelligence enough for that. (Laughter.) When plaster is used at the same time moderate decomposition takes place, sufficient just to rot the straw, and bring the whole to the consistency of soft cheese and put it in the best possible condition for the plants outside on the fields to take advantage of.

Mr. ISAAC HILLBORN—Part of my manure is under cover and part of it is not. Is there not often a loss for want of water by too much heating

Mr. MACFARLANE—There is no doubt that when you keep it away from the water altogether a lot of nitrogen goes off, but that can be prevented in two ways. You can keep the manure moist. That is one of the best ways to prevent what is called "fire-fanging" The introduction of plaster prevents the same thing. I know of no instance of it occurring when the manure was plastered.

Mr. J. B. ASHLEY—I would like to know whether Mr. Macfarlane thinks we, as farmers, have room to stow all our manure under a shed without at sometime during the winter taking it to the fields? We cannot possibly stow all our manure under a shed. We must eventually take it out on the land before spring comes.

Mr. MACFARLANE—If the necessity exists for taking the manure into the fields I should say let it be done, but by all means see that nothing escapes from it in the shed. Any loss that takes place in the field, if plaster has been used, is from leakage and that is kept on the soil to some extent. Any escape of nitrogen into the atmosphere is impossible with plastered manure.

Mr. H. G. Clark—What effect will sprinkling wood ashes on the stable floor have, and what kind of stable manure would you recommend on mangels?

Mr. Macfarlane—I should think the scattering of wood ashes would have a bad effect. It would have a tendency to liberate the nitrogen in the shape of ammonia. Some people have also thought that by using common caustic lime they were doing just as well as using plaster. The result of its use also will be to liberate valuable constituents from the manure. In regard to the second question that the gentleman has just put, there are a great many things to be considered, such, for instance, as the condition and nature of the soil. I do not think that I am sufficiently wise to give a short answer to that question.

The President—I would not, until we stop the leak in the stable floor by the use of land plaster, buy a single ton of fertiliser. I believe that if we got the manure to the field in a proper condition there would not be any fertilisers bought. I don't say anything against them, but I think it is a great mistake to buy constituents which we have already, and see thousands of dollars wasted through improper care of our stable manure.

Mr. Macfarlane—What the president has said in regard to nitrogen I fully endorse. We would never require to buy it if proper care were taken with the natural manure, but if you are selling produce off the farm that takes away phosphoric acid and potash you must do something to replace them.

The President—I have to thank the Professor very warmly for the able address we have received. It has been exactly what we desired. I have now great pleasure in introducing Mr. Sprague, and I hope he will devote a large portion of his time to the silo, because that is the most important question we have in this country to-day.

ENSILAGE AND WINTER DAIRYING.

Mr. John Sprague (Ameliasburg) was next introduced. He said: I am very much pleased with the address of our president this morning. It was a very practical one. I think he foreshadowed what would be sufficient to occupy a meeting of this kind for several days without entering into other matters as should be done. I was also pleased with everything else which has occurred to-day but one thing, and that is being called upon to speak to you this afternoon. I am like the man who got married, and after the ceremony said he felt very despondent. His best man asked him as to the cause of his trouble, and why he was not more cheerful, "Well," he said "the day would come sometime—he did not know how long it might be—when his wife would die, and then there would be the expense of the funeral." (Laughter). I do not think I have taken in what has been said as I would have done if I had not been aware that I would have to speak. I anticipated the end from the beginning. Now, our President has introduced me to you as an old dairyman from Prince Edward but I may inform you from the outset that I am no public speaker; that is not in my line of business. It is very easy to sit and talk about these questions, but it is a different matter to get up here and speak, and the effect is to produce a sort of weakness in the knee, and the voice does not have the natural sound in your ear, and all these things tend to make your own position very unpleasant. However, I hope you will bear with me this afternoon remembering that I am not a public speaker.

I have given the dairy industry my attention for twenty-three years. My first experience was with the co-operative system. I think we had about the first factory east of Toronto. That factory was established on the joint stock principle. It languished under the management of many men and eventually became defunct. Immediately after that catastrophe occurred I myself established a cheese factory in our neighborhood on my own farm, and during all these years I have been "boring" away in that direction to a certain extent. Five years ago—1885, I think it was—I introduced a Laval separator. Since that time we have conducted our operations both in the manufacturing of cheese and butter, something on this line in the early part of the season to make butter,

receiving the milk from the farmers, taking the cream from it and manufacturing it into good butter. Good butter is our forte. We return the milk to the farmers. This continues till the first of May, and we run cheese through the hot season until, say about the month of August, when we commence skimming again and making butter. We usually continue making cheese until the factory season closes. At the close of the factory season we buy all the milk we can from the farmers. We have been paying last year—we are paying now—a cent a pound for milk. We are making butter that we are getting twenty-two cents a pound for. Well, I can go to hundreds who get from sixteen to eighteen cents. The fact is that the relative loss is so large that we as farmers cannot afford to face that loss. I think it has been something like four or five cents a pound on butter. The loss is actually greater than that. I believe that we in this country, by adopting a system a little different to what we have at present, could make up our minds to continue dairying operations the year round. It is astonishing how quickly certain modes of operation become natural to you when you once adopt them. Years ago we considered that when the factories closed the operations of the cow ceased. We acted as the dry nurses to them. When milk was cheap in the spring we had plenty of it and when it was dear in the winter we had none to sell. Now, to a certain extent, we have changed that line of action, and it is quite pleasing to us as dairymen that we have adopted a means whereby we can get continual cash returns from our herds. I have an address written out here and may as well read it in case I forget it later on. When we consider the immense capital invested in the farms of Ontario, and are told that for the last four or five years the income of our farms has not been enough to repay the labor and other expenses employed to conduct our farming operations, to me it is apparent that no other branch of industry could have withstood such a lengthened period of adversity. Had it been possible for us as farmers to have withdrawn our capital from this line of industry our numbers to-day would be largely on the decrease. But this change with us seems almost impossible, and from the very necessity of our situation we continue a branch of industry yielding a loss, *i. e.*, if the market value of our labor is considered. Admitting those facts to be substantially correct we must next admit that there is something wrong in the manner in which we conduct our business or some other cause for this bad state of things. We are told by some that to succeed as farmers we first must abandon many of the luxuries of life that we now enjoy; dispense with fine clothing, fine carriages and return to cheaper modes of living. By others, we are told that to succeed we require more protection, that cheap corn, oats, other grains and other farm products be excluded from competition in our markets. Now, we have somewhat abandoned our luxurious modes of living and to a certain extent have tried protection, and, not yet having obtained a better position in the field of labor, it is high time we changed our line of action in some respects. The dairy and its products being the object of this meeting it is to be hoped that our discussions may tend to knowledge in this particular line. At our annual convention in Guelph on January 17th, 1888, I gave an address on the silo and ensilage. 1887 was my first year growing ensilage and at that time I believed and advocated the introduction of ensilage to our farms as being one of the most important steps in the direction of success. To-day, after four years practical experience, I again call the careful attention of those present, and also the farmers of Canada, to this method of providing cheap and good food for our herds. The last four years have borne testimony to the correctness of my assertions. I claim the honor of being among the first, if not the first, to construct a silo and continue the same in practical use. I need not enter into a detailed statement as to the best methods of construction of the silo nor give directions as to the growing of corn feed, this information, given by me to the farmers of this country in 1888 being practically correct, experience having proven most conclusively to me that no farmer can afford to do without the silo for a single year. The time has gone by when it is required to show that ensilage is one of our best foods for cattle; also one of the very cheapest. By the use of it the extent of our dairy production can be increased tenfold and even more than tenfold beyond our present production. We as farmers in Ontario have now a wide field opening to us, and it now is time that we avail ourselves of the opportunities set before us. Let us be quick to abandon pursuits in our business that get for ourselves

loss, and quick to adopt some branch of our calling that will result in a gain. With the use of the silo and careful attention to the details of our dairies we can, and surely will, succeed.

Mr. Sprague, in supplementing his paper, said: Almost any farmer is aware how he can construct a silo, although I warn all those who attempt going into this arrangement to carefully observe the modes of growing and harvesting the corn feed for ensilage. I think there has been a tendency to carelessness in this respect. I know of one silo that was built in our vicinity on the "cheap," and a large quantity of silage was spoiled. We have no more apprehension as to our silage keeping than we have with regard to our hay when it is got into the barn properly cured. There is no doubt about it whatever; it is a sure source of cheap food. The cheapest source of production is the one on which you have got to depend. These observations should be by us well attended to. There is no doubt that this country is well adapted for the growth of corn and many other cheap foods—particularly corn; and we are highly favored as a dairy country. Now, my friend (Mr. Moyer) objected to winter dairying, and said that our butter then would lose its prestige in foreign markets. We all know that September, October and November butter is always very fine, and by good feeding and proper ventilation of the stables we can produce good milk through the winter months, and if we get the milk, we have men who can make the butter. We have in Ontario, men who can make as good butter as can be made anywhere in the world. We may make not so much of it. But we have an idea in this country that we want a good cow to make beef when she gets too old for milking. Well, she will not make good beef. There is a good deal of the butter made in the dairy just about right to fry that beef in, and when they are both fried they are not worth much. (Laughter.)

Mr. Hunter.—I would like to ask a question. At the outset, Mr. Sprague said that in buying his milk it cost about ten cents a gallon; that would be a factory gallon. Do you apply any test as to the percentage of butter the milk is composed of as the farmer offers it?

Mr. Sprague.—We take it generally as it comes. However, we are careful to observe the quality of the milk.

Mr. Hunter.—You would not give more for milk containing four per cent. of butter-fat, than for that containing three-and-a-half.

Mr. Sprague.—Oh, yes.

Mr. Hunter.—Coming back to the silo, we have got to feed cheap food before we will have anything for our labor, and though I am fond of a little work, I like to get paid for it reasonably well. Would you be pleased to state about what profit that butter you realise twenty-five cents for left, after the labor and money expended on it?

Mr. Sprague.—I could not tell you exactly.

Mr. Hunter.—Will Mr. Sprague's son tell the yield of butter to the hundred pounds of milk?

Mr. Mark Sprague.—Five pounds and one ounce to one hundred pounds of milk.

Mr. Hunter.—Leaving that point, Mr. Sprague passed over the method of planting corn. He spoke very strongly and emphasised the condition of corn cut for the silo. There are a great many who do not know how to plant to get it to grow profitably for the silo, nor how to put it into the silo.

Mr. Sprague.—I hardly thought it would be necessary to deal with that. I took for granted that you knew how to fit the land. You all know the kind of soil.

Mr. Hunter.—Bear in mind that each of us has a different soil and we cannot just change that.

Mr. Sprague.—You all understand very well where you can grow corn. We do not change our field annually. We have grown our corn for ensilage on the same field from the commencement.

Mr. Hunter.—What is the method of planting?

Mr. Sprague.—We fall plow. In the spring we gang plow when nearly time for planting; pulverise the soil well; and use an ordinary seeder, using two drills set from nine to eleven inches apart. We plant in rows north and south, and use about three pecks of corn to the acre for seed. As soon as that corn is up we cross drag it a little. Later we cultivate it and continue cultivating until the corn becomes pretty large. That is the process of our growing corn. I was of the opinion before we commenced growing ensilage, that a single crop of corn upon it destroyed the productiveness of a piece of land, but my experience is that our soil is in better "tilth" than ever before, and last year we raised the largest crop we have ever done except the second season after we commenced. That was a season when there was a large amount of rain.

A Voice.—Did you manure the land each year?

Mr. Sprague.—We started on that principle; we manured the higher parts of the field three years; we drew out the manure in winter and put it in the field about where we wanted it and spread it. We could not produce enough manure to cover the whole field; but even where there has not been a single load of manure the corn has been very good.

Mr. Moyer.—What is the idea of growing on the same soil all the time?

Mr. Sprague.—The principal reason is, that the corn crop is a pretty heavy crop to handle, and the nearer you can grow it to the silo, the cheaper it is to harvest; therefore, we use the nearest fields to our silo. Another reason is that seemingly that field has been in better "tilth" for corn than any other, being more porous and open; and again, there is another reason, less cultivation through the summer will do.

Mr. Hunter.—How many acres do you usually sow?

Mr. Sprague.—The first year we had thirteen acres, but we put four acres into field corn for fear the ensilage would not succeed. The second year we used the whole field and had so much corn that we could not use the whole of it.

Mr. Hunter.—How many head of cattle had you?

Mr. Sprague.—Thirty-five head over winter.

Mr. Hunter.—Is there any grain given to the cattle?

Mr. Sprague.—Well, if you are milking a good deal you give grain. You must not run away with the idea that you can do everything with ensilage.

A Voice.—What kind of a soil have you on the field?

Mr. Sprague.—There is a limestone, gravel knoll on one part of the field; small clay knolls on another part, and then on the other part a black loamy soil. We find corn grows well on the whole field. Prince Edward is a fine corn county.

Mr. Isaac Hilborn.—I have been a convert to the silo and have just tried it this one year. Wouldn't it do just as well to plant east and west?

Mr. Sprague.—We planted three seasons north and south and then east and west for a change. Have the corn so that the sun can get nicely in about the ears. I found that during showers the corn seeds were sometimes inclined to run down the gullies when planted east and west, part of the field being a hill.

A Voice.—What kind of corn do you sow?

Mr. Sprague.—Except the first year I never sowed anything but Mammoth Southern and Red Cob Ensilage.

A Voice.—I do not find my ensilage in good condition. It comes out of the silo acid.

Mr. Sprague.—There is a possibility of making two kinds of ensilage; that is sweet ensilage and sour ensilage. Sometimes it is soured by making it too green, and then another cause is that we put it in too fast and too large and do not allow it to acquire the proper temperature. What I mean is that the corn heats of its own natural action.

The PRESIDENT.—The point is how to plant this ensilage corn. A sandy loam is the best soil if lumped with plenty of manure and when so advantageous as to have ashes spread them and change the field each year. Have the corn three and a half feet apart, the kernels dropped in the drills eight inches apart, taking eight quarts instead of three pecks to the acre of corn. First cultivate with a harrow. If you plant lengthwise of this room you would go cater, with the teeth of the harrow a little back slanting. The next time go back the other way and keep on doing this until the corn is about four inches high. Then take the cultivator, going lengthwise. It keep the crows out of the corn, and the boy out of mischief. (Laughter). And it raises the greatest crop in the world—thirty tons to the acre. Then get it to the silo when nearly matured—when the corn is perfectly glazed. It will make sweet ensilage, just like a bottle of preserves which our wives and daughters know so well how to put up. In the feeding of your cow, supposing hay is worth $8 and ensilage only costs $1.50 you at once have a considerable saving, and along this the line of profit lies. Don't hang on ten or fifteen years to find out about this matter. We tell you that we know that you can raise thirty tons to the acre; we tell you that it will make more milk food in conjunction with other foods. What you want is some ensilage corn; a grain ration; and feed hay once a day. This gentleman wanted to know of Mr. Sprague how much it cost for this milk in the winter time. Now it will cost you thirty per cent more in the winter time for feed to make milk than it will to feed a dry cow. The product is worth nearly thirty per cent. more in the winter time than in the summer, and the consequence is that you get yourselves at once right in line by having butter to sell when everybody has not got it to sell, and you have not got so much to sell when everybody has got plenty of it to sell.

Mr. HUNTER.—Mr. Sprague speaks of growing his corn repeatedly on the same field and without manure, while the President speaks of changing the field and manuring very heavily. Let us reconcile these statements.

Mr. SPRAGUE.—We all must admit that the better land is manured the better the chance is for a good crop. At the same time I maintain that we can grow on the same field and get a good crop. We have instances where people have grown it for thirteen or fourteen years, of course putting on the manure. The quality is in the soil for growing corn.

The PRESIDENT.—The idea is the cultivation of the soil. We summer fallow a great deal. I do not believe in it, you know. Summer fallow by means of this corn crop. Keep the boy going and if he sees the farm growing in value from time to time, and, through cultivating the soil getting enriched, he will begin to take an interest in the place.

ENSILAGE CORN.

Professor ROBERTSON was received with applause. He said: I am very sorry indeed that I was not here when friend Sprague was giving his address on corn, because any man who has gained very large practical experience is able to express an opinion of much service. I will likely cover some of the same ground, and I want to speak very compactly and touch only some of the main features which present themselves to my mind. This chart was made to represent the results from growing corn at the farm near Guelph, so you have it suitable to conditions around Berlin. I want to say that the farmers of Ontario should grow corn because it is a very hardy plant, because it is subject to very few diseases and because very few parasites attack it. You cannot cite any other plant that is so free from these ailments and attacks.

Varieties vary as to height of growth. Some of them are two feet high when matured; some are seven feet, and I have seen corn growing to all heights from two feet up to eighteen feet. The stalk may have any number of joints or nodes, and it may grow an ear at any node, or may have three or four or five or seven on the same stalk. The ears themselves always grow an even number of kernels. You can always divide the

number by two; I have never saw thirteen or fifteen, although I have seen up to thirty-two around the same cob. Just a word as to selection. On the Brandon farm this year we had planted rows of Squaw corn. You know the Squaw corn has white kernels and red kernels and variegated kernels. The yield from the white kernels was twice as large as that from the red grains of the same corn. From this point, by a careful selection of Squaw corn, it may be learned that growers can raise Squaw corn eight feet high and have early maturity. I need not detain you longer upon that aspect of the question.

Let me come to another practical aspect—the question of the soil and its preparation. Now, if you can make a crop mainly feed where no other crop can get its food then that does not exhaust the productiveness of the soil. If you have a crop of wheat and a field of oats and barley, all of which feed near the surface, and then grow corn which feeds down lower, it will loosen the soil below and take little from the soil at the surface. If you take the roots of the corn plant, by washing the soil from the fibres and having them measured, you will find that these fibres are very often from fourteen to eighteen inches long. Thus, because it feeds deep, it is not an exhaustive crop in the ordinary farming sense. These fibres loosen the soil by digging down through and liberating more of the mineral matter.

The best way to prepare the ground for receiving the corn crop is to plow very deep in the fall, that the frost may act to liberate the particles of soil. Then cultivate early in the spring, because that will kill the weeds, and corn must have clean land to do its best. After an interval of ten days cultivate again. Another interval of ten days will give you a fresh crop of small weeds. Then give the ground another cultivation, and in ten days it will be ready for the seed. I would put back the planting three weeks, and thus I would keep my field clean and in better shape for the following crop. Plant the corn in drills from three to three and a half feet apart. I would drop the seeds four inches apart in the drills, and would take eighteen to twenty-five pounds to the acre. I have sown fourteen pounds, but still I think I have got better results when I have sown rather more. After the plant is high enough to shade the soil it still requires to be stirred up. If loosened it acts like a mulch and breaks the capillary movement of the water from below. I like to have the corn wide apart also for the sake of getting a larger growth of leaves. A good many men have said that the leaves do not contain much nutrition for animals. I notice, however, that they eat the leaves first. When I come to give a theory for that there are those who say that a man who is theoretical is not so strong as a man who is practical. If he has a safe, sound theory and understands what he is doing, then he can with more safety assure himself of the right way of doing it. It is a good thing when a man can render a reason for the faith that is in him, and also for the practice he follows. Then I find the green coloring matter is the peculiar principle in plant life which secretes the carbon from the atmosphere, and the broader and more healthy the leaves are and the darker the shade, the more carbon they will appropriate from the air. Well, if the farmer can get carbon in this way it does not cost anything for the support he gets out of the air. He can never appreciably lessen the store of plants. Leaves are most active collectors of the valuable constituents. By analysis of one hundred and sixty stalks of corn, grown at the Ontario Experimental Farm, we found that nearly one-half of the nutritive properties rested in the leaves, one-quarter in the stalks, and one-quarter in the nubbins. For that reason I want abundance of leaves. As to the stages at which the corn plant should be cut for filling the silo; first of all let me say this: I find that when you grow it broad-cast you can often, in a moist season, get a rather heavier weight to the acre, but the weight is largely water. Then the man who grows corn broad-cast will find that he has the most trying crop to harvest that he ever found within the fences of his fields; and the man who will harvest such a crop in an average of seasons in Ontario will have to bite his lips or say something he does not want his wife to hear. (Laughter.) I find that when you get the corn in rows, it is neither so tiresome nor expensive to harvest. Now as to the stages at which the corn should be cut. You have the stages of tasselling when the tassel or plume comes through—the silking stage. Then you have another stage. When the kernels begin to have the juicy quality of the milk stage.

When the juice becomes gummy, you call that "the late milk stage," and after the glazing period, you call that "the ripe stage." The very best stage to cut corn is at the glazing stage. If you cut it before, it does not acquire all that it would take unto itself. Its structure is weak. As ensilage it becomes acrid and partly sour. For both reasons therefore, let it reach the glazing stage. Let me give you the exact amount of nutriment got from corn cut at these two stages. In one field, corn of the King Philip's variety was cut "at the tasseling stage" on the 30th of July, and yielded nine tons to the acre. The second was cut on the 9th of August at "the silking stage," and it gave twelve tons seventeen hundredweight, the next was cut at "the milking stage" on the 21st of August, and weighed sixteen tons six hundredweight; the next at "the glazing stage" on the 7th of September, and it gave sixteen tons two hundredweight; the next at "the ripe stage" on the 23rd of September, and it turned off fourteen tons four hundredweight per acre. In the above that cut at "the milk stage" gave the greatest weight, sixteen tons six hundredweight. Let me show the solids of these stages. At the tasseling stage it contained ninety-one per cent. of water, at the silking stage eighty-eight per cent., at the milk stage eighty-five per cent, at the glazing stage seventy seven per cent,, and at the ripe stage seventy-two per cent. So, while there was less weight to handle at the latest stage, there was more substance in the crop and it had more feeding value. After all when a man is growing a crop he is not after water for his cows that he could give them more easily through the pump. (Laughter). People have ridiculed feeding turnips because they have so much water in them. Well now, they have a great deal of feeding value, mainly because they have a stimulating principle. People say stimulants are of no value. The turnip has an effect which has a peculiarly stimulating action upon the cow's digestive system, but still I would not water the cows with a corn crop. With respect to these experiments, there were 1,619 pounds of dry matter per acre at the tasseling stage. Then at the silking stage, there were 3,078; and at the milk stage, 4,643 pounds; at the glazing stage, 7,202 pounds, and at the ripe stage, 7,918 pounds to the acre. So that the value of the crop is not to be judged by the weight of the green plants.

Let me show you another matter. A corn crop was treated in three ways. Part of it was not matured when it was put in the silo; another part was put in the silo when in the glazing stage, and the third part was kept in the field in stooks. Now three animals were fed on these three different preparations of corn. Two men stayed with the cattle night and day, and saved all the voidings and put them into tanks. Analyses were made to see what was kept by the animals. This was not done at our station, however, but at the New York experiment station. Now I might analyse saw-dust, and find that it contained so many carbo hydrates that it would seem to be just what the cow wanted, but the cow would pass it by. Now in these three treatments, the animals digested of the ensilage put in an immature stage sixty-six pounds out of every hundred pounds of the solids. That is, thirty-three pounds per hundred pounds were voided that the animals did not digest. Of the ensilage put in in a more mature stage they kept sixty-nine pounds per hundred pounds of solids eaten, and of ensilage cured in the fields, they kept sixty-two pounds per hundred pounds. So that the animals digested the larger proportion of the corn when put in the silo, and of that put in the silo they digested more of that which was put in a matured state than of the other which was immature. Everything points both in science and practice to the beneficial effect of growing the corn till it comes to the glazed stage. But let me say just a few things more which will help you in your practice. I find this, that if put in the silo direct from the root without any wilting or drying, that the acid formed is lactic acid and smells like sour milk, and that is why some ensilage simply stinks. Now if the corn be allowed to wilt for one or two days, a peculiar fermentation is started. That is the first stage of hay curing. You can all smell that delightful aroma that floats across a hay-field after it is cut down. It has nothing offensive whatever. Where lactic acid is in ensilage, it is apt to start a sourness in the milk because the atmosphere becomes filled with the germs that make lactic acid. It is a fermentation starter, and for that reason the people blame the silo, when merely a little thing has not been attended to—to have the corn plant wilted. If grown to near maturity and then wilted and filled into the silo, and the sides and corners trampled, you will have

good ensilage every time; and every cow fed will give you nearly one-third more milk on an average than the same cow fed on dry food all winter. People do not think that this is an important thing. We have been feeding in a way not merely expensive, but in a way that thwarts the animals from giving us the largest results next summer. Let me say this in conclusion to these remarks. I put it this way, that if you begin by having more stock on the same land and the land is abundantly manured in a favorable season, you may get 30 to 40 tons of corn to the acre—but *that crop* is hardly within the reach of every man. But every man under ordinary conditions can get sixteen tons to the acre of those kinds of corn that will ripen. That will enable him to feed four cows all winter from each acre. If a man has a hundred acres of land he should keep twenty-five cows. Now six and a quarter acres of corn will winter twenty-five cows. If he wants to keep more cattle, let him put on more acres of corn and keep more cows. Every acre feeds four cows during the winter, and the manure makes more corn. I do not know of a better practice than to begin growing corn and having a silo, and then adding to that practice, the making of milk the year round by having cows coming in in the summer, winter, spring and fall, and having an income the year around and raising stock the year around.

Mr. E. Miller (Brockville).—What kind of corn would you recommend?

Prof. Robertson.—First of all on general principle, I would get a corn that matures early. Pearce's Prolific will mature anywhere in Ontario; the other varieties are King Philip's, Flint, Thoroughbred White Flint, Longfellow, Wisconsin White Flint, Michigan White Flint, Minnesota White Flint, and Selby's Pride of the North. Pearce's Prolific does not yield so much to the acre, but it is the earliest to ripen of all the common corns I know.

Mr. Hunter.—I understood you to speak about wilting corn for a few days previous to siloing it. Supposing you were caught in a frost, what would you do then? Have you ever had experience of adding moisture in the silo?

Prof. Robertson.—I have had no experience of adding water. I once had corn frozen very badly but put it into the silo before it was so dry as to need moistening. If too dry I would add water. I have never seen ensilage without some acid, but I have seen some with acid that smelled nice. The difference is whether the acid is ascetic or lactic acid.

Mr. Hunter.—I have had experience and met with the best success, but by your reasoning that dry corn should have had no acid, and I have found just as much acid with dry corn as with moistened. I siloed it and my cattle are eating it just as well but I do not think it has the same feeding value.

Prof. Robertson.—Why don't you think it has so much feeding value?

Mr. Hunter.—I do not think the yield of my cows is so good as what they have given when it is not soured so much. We will be overtaken by an early frost now and then. It is a mistaken idea to think in that case the corn is worthless for feeding. You need not look upon it as first class food but it is much better than attempting to feed out of the shocks. In case of not being able to get access to the ensilage from the top of the silo would it be possible to commence at the bottom and cut a passage through the ensilage without injuring it to any extent?

Prof. Robertson.—Wherever air is admitted on its face we have mildew of from two to six inches.

Mr. Hunter.—I understood Mr. McMillan to say that he was feeding in that way and his ensilage took no injury.

The President.— It will injure.

Mr. John Fennel.—Is it ever proper to keep the ensilage uncut? Will you be good enough to give us any information respecting clover as an ensilage?

Prof. Robertson.—We have always felt that if we put it in uncut it would be at the expense of the contents. It has to fit close where the butts are or the air will get in and destroy it. The corn stalks if put in whole must lie in a uniform direction or they won't fit. Then it is not so handy to take out the corn stalks. At present I have no experience with clover ensilage. It is sometimes fed to swine with advantage.

The convention then adjourned till eight o'clock.

EVENING SESSION.

At this session the President gave up the chair to Mayor Jansen. The addresses and discussions were interspersed with music by an orchestra and the German Glee Club, whose efforts contributed to the enjoyment of the large audience.

Mayor Jansen repeated his welcome of the morning to the Association. It had been correctly stated, he thought, that agriculture is the foundation stone upon which all other industries of this province must rest. If the farmer is prosperous the merchant and manufacturer cannot be otherwise.

The Mayor elect, Mr. J. M. Staebler, was called upon, and in felicitious terms joined the retiring Mayor in extending a welcome to the Association.

The President replied in appropriate language, thanking the gentlemen who had just spoken for their cordial and hearty reception. He said that in the prosecution of their duties as an Association they experienced very few things that were pleasant. The talk all the time was about the poorness of goods. They were here to-day for the purpose of talking to the people as to the means of putting more money into their hands and in this way help the general prosperity.

THE DUTY OF FARMERS.

Mr. E. W. B. Snyder, M.P.P., was next introduced. He said this dairy industry was a question which ought to be a subject of more reflection. I may say that in listening to the several professors who addressed you this afternoon I was very much pleased to hear them discuss the question of our creameries. There is no doubt in my mind, after listening to what they have said, that a very great improvement can be made in that direction by our farmers, and I think I can say on behalf of these farmers that they can say the same. Now, when matters of this kind are discussed, and discussed with advantage to the people who are directly affected by them, then of course it must lead to an advantage to the community at large. It appears that the creamery business so far in our country has not been so successfully carried on as might be desired, and for that reason apparently our governments have interested themselves in trying to educate our farmers in this direction. There is no doubt in my mind that so far the subject has not carried the weight that it really deserves, or that it should have carried, but I believe the more the matter is brought before the people the more interested they will become and the more they will study up; and in fact it is necessary to study at present. The farming community we know are not in that state of prosperity we would like to see them. It is not owing to the creamery alone, but at the same time when a matter of this kind is discussed, being of such importance, our farmers should take an interest in it, and I am glad so many of our farmers are apparently taking an interest in it and are coming out to establish it. Living as I do in the village of St. Jacobs, where a creamery has been in existence for some years, I have taken more interest in the subject than I would have done had this not been the case. In 1882, I think it was, a company was organised for carrying on the business. Prior to that a company was trying to run a butter factory and cheese business in connection with it, They did not make a success of it and the farmers took hold and formed a joint stock company; but the difficulty apparently is that the farmers when they join together seem to lack enthusiasm to carry on a thing of this kind to success. At least our experience was that the business was lagging along and doing a fair business for two or three years, and then they concluded to sell out again, and I understand this creamery was sold out quite recently. To farmers from that neighborhood I would say, you should put forth better efforts, in fact now that you were doing for yourselves you can plainly see that you were not able to make a success of it. When you see other men taking hold of the business and making a success of it help it along as far as you can. This is not the only creamery in our county, and possibly there are not many coun-

ties where there are as many as three creameries, and the fact of having three creameries established here shows that some interest has been taken in the matter heretofore. Well now, none of these should be allowed to go to ruin again, because it has been shewn by speakers at this convention that the creamery can be made a paying business. If they can be established, I hope that the farmers will give their assistance and make the industry as successful as possible. A creamery business of three factories such as we have at St. Jacobs, ought to be able to make an output of from thirty to forty thousand pounds a year. If a better product of butter can be made in the creamery than by the farmer, he is just merely wasting labor and money by continuing the old system. That is a matter which ought to be prevented, and I think, if people will only allow themselves to be educated in the proper direction, this money can be saved.

One subject that was brought up and discussed considerably this afternoon I thought was of very much importance to our farmers, and though, no doubt, a number of them had heard of it before, they are not working in that direction; that is utilising the fertilising powers they can draw from the air. I suppose there are very few farmers who have given that subject the attention it deserves. I take it that a very large amount of fertilising matter can be drawn from the air and utilised without any cost to speak of. It is not a matter that requires to be understood. There should be no difficulty about studying it out, but by the growing of certain crops the farmer should in that way so utilise this fertilising power that he can steal from the atmosphere so very cheaply. It is really too bad that such a valuable assistance should be left lying dormant, so to speak. There is no doubt in my mind, from the way the discussion was carried on this afternoon that in a great many cases farmers are making a serious mistake and losing money and labor just through lack of knowledge. Now, when our Government are assisting you in this way, by sending out men to discuss these subjects who have made them a life-long study, then surely the farmers should not be derelict in their duty. If the farmers do not choose to take advantage of these things, then they cannot blame the Government for an expenditure without any fruit in return for it. I do not believe that any money should be spent without bringing forth fruit, but it lies with the farmers themselves whether they will avail themselves of these opportunities, or whether they will allow them to slip by without getting any benefit. The farmers now require, and should be assisted, in all possible ways that the Government can aid them. At the same time the Government may aid them probably too much. They may aid them so much that the people will not relish it so much as they should. If there is too much given to anything, why, of course, it falls flat. But I do not think that our people consider that there has been too much money expended in this way. I, for my part, think that the Governments are fully justified, and I think the people will bear them out in going on expending money as long as it bears its proper fruit. I have not made it my study, but I know this much, that if worked up, the same advantages would arise in this as in any other business. I remember, when a young man, I happened to strike on a certain line in my own business that was quite new at that time, and launching out on the views that I then held, and that I thought were right, and being one of the first of those who went into a certain system of mill-working at that time, we had the advantage of all others. Now, this is a question that has advantages in the same way. If you start it in advance of other sections, you can reap the cream of the business, but if you allow yourself to lie low and others to get ahead of you, of course, you will have to be satisfied with the poor results that you will achieve. (Applause).

THE BUTTER TRADE AT HOME AND ABROAD.

Mr. Moses Moyer was next called upon, and said: I am sure there are a good many reasons why I should feel proud. One is that I have the honor to address the people of my own native town, which has been spoken of so highly to-day. I am now living in the best city on this continent; at the other end of the business which I have been doing here. Those that are acquainted with me know what part I took in this dairy business.

years ago. One particular friend of mine once stated that he believed if one of my veins was opened up butter would run out of it. (Laughter). I was then in a country store taking butter in exchange for goods. I have handled it as a storekeeper in exchange, and am now at the other end handling it out for the consumer's table, but before I got to the other end I had to learn a great deal, and I have learned a great deal more there, and I would just like if every farmer in this country could serve an apprenticeship of six months in Toronto "dishing" out the butter we get, for I think it would result in the greatest improvement of anything that could be introduced. When I was taking in tons and tons of butter here and a customer wrote me from Toronto for choice butter, I had very often to say I hadn't it. I looked upon this as a business that had to be remedied, and I worked in this direction until I had lost nearly all my money and heart too. However, when I come around and see people taking up the matter just about on my line, only with some improvements, I think my time was not lost. So I suppose through my work the country has been paid, whether I was paid or not.

I always held the opinion that butter could be made best in the factory, as well as cheese, and I am of that opinion still. You all remember what a terrible time we had getting the cheese industry started in our country. Factory after factory failed, and only years of struggling brought it success. To-day we stand first in the English markets. Why can we not do the same with butter. I am thoroughly convinced that we can make as good butter as is made on the face of the globe. My principal difficulty when I first started the creamery business was that I could not get a sufficient support from the farmers to make it pay. So many held back and let me do the experimenting to see how the thing would work and then if profitable they would come in. That was like the story of the boy who was told by his mother never to go near the water until he first had learned to swim. (Laughter). How could I make it profitable if I had to go all over the county of Waterloo to get as much cream as I should get from three or four farmers. That was one difficulty. Another was that every farmer thought he was making butter so good himself that it could not be improved. It is natural only to suppose that what I have is better than what some one else has. I found that every woman in the country made the best butter, and that led me to say what I did say to-day that the butter that is not very good is not made by any body. (Laughter). A great difficulty was that some cream was better than others. Experiments have been made since which have overcome this, but the greatest difficulty at first was to know whether you were getting cream or milk. When it came to the factory we often found that we had really got more milk than cream from some, while others who sent good cream were not satisfied in getting the average prices. We have now a system by which we can tell the quantity of fat contained in the cream. Now, when that can be done, and everybody is paid according to the value of his cream, the creameries are ahead of the cheese factories. The cheese factories pay for the milk on an average. Now, we all know there is a great difference in milk. We know there is milk where seven pounds make a pound of cheese and other milk where fifteen and eighteen pounds won't do it. The cheese factory system is like the story of the sailor who went across the ocean. He was told when he went over the first time that any one who brought a boat over safely was entitled to a suit of clothes. He got the suit and put it in his bill. The owners asked him what that was for, and he said, "Well, they told me over there it was the custom. That the captain always gets a suit of clothes at the expense of his employers;" but they told him "they could not do that." The next time he put in a little here and a little there in his bill to make up the amount of a suit of clothes, but did not mention what it was for. They said "It was all right now." (Laughter).

If people don't see a thing, they are easy to please. I would like, however, that the creamery business should be started all over the country, and what I said before dinner was, not that I am opposed to winter dairying, but that I am opposed to this, that the cheese business should re eive all the encouragement through the summer, when milk is the best, and then the butter-making should be taken up in the fall when the milk is not so good, because I think it will have a tendency

to keep butter down as flat as possible all the time. It has been said by one of our speakers to-day that he can take five pounds of butter from one hundred pounds of milk. I always counted twenty-five pounds of milk to a pound of butter, and even with that proportion butter-making pays fully as well as cheese-making. It has been proven that it pays you better, and that it saves a great deal of work for your women who are overworked on the farms to sell your cream than to make butter yourselves. Make your homes comfortable and let your butter be made up in creameries where they have the appliances to make it much better than you have at home.

Well, as I said, now I am down in Toronto selling to the consumers. Since I have been in Toronto I have learned more of the quality of butter than I could possibly have learned anywhere else. Little children come to the store and nine-tenths of them know more about butter than the farmers throughout the country. Farmers get used to their own butter, and think it is all right, but we sometimes have a dozen different qualities, and by comparing and tasting it, the customers get to be such experts that it is easy for them to tell the quality. Why, sometimes I have seen farmers come in with butter and with a smile give me to understand "there is something good, now." I don't like anything better than to put their butter on the counter and wait until some of my customers come in and in their presence say, "I don't like that." It almost "takes the wind out of him." I say only about one pound out of every hundred pounds we dare offer to the best of our customers. Good judges of butter can tell the extra flavor of butter as readily as an artist can point out a beauty in a picture of which you never thought. That is where butter making becomes profitable; just when you learn to put on the best finishing touches. We put down butter that we know is from the best makers, and we give twenty-three cents a pound and it always goes first, and we have butter we are paying five and six cents a pound for and cannot move it. Nobody wants it. There is the milk produced by the honest cow made into that stuff. Why it would make the cows cry if they could see it. (Laughter). It is something abominable, and if the farmers won't stop it, I hope the Government will put a penalty on those who send to the city such butter and offer it there. We handle different things there. Sometimes apples are sent down. Now, a farmer goes to work and plants a tree and after it bears fruit he will shake the apples down because it is too much trouble to pick them. After taking care of the trees for years, in order to save a few hours time, he will send them down to market to sell at half price? After the expense of raising a cow, to save a little time or extra pains the butter is to be sold at half price. Is that reasonable?

Now, I would just say a little about the market in England. We have no market there for butter. Why? Simply because we sent them such miserable stuff, except the creamery, which is so little that it did not amount to anything. You hear people say that they are afraid of over-stocking the market, but there is no danger of that. The more cheese we make the more seems to be wanted, and so it will be with butter if we make it good. At the table to-day at noon at the hotel I was ashamed of the butter. (Laughter). I thought that the people of Berlin would get the very best butter that could be bought for this Association, and at the table I sat to-day three of the members turned up their noses and never touched it. I am ashamed of that. I thought the people of Berlin would give them something nice and I know if there is any good dairy butter made in the Dominion of Canada it is made by the farmers in the county of Waterloo, but to-day they gave us miserable stuff.

The German butter stands very much the same in relation to our home market as the Canadian butter does to the markets of England. While I say again, some of the finest butter in the Dominion is made by them, there has been enough wretched stuff made by them to get the credit for making all the bad butter, which is commonly styled "Dutch butter." All the bad butter in England is "Canadian butter," even if it had come from China. You see therefore, that you can get a bad name through your neighbor, and the importance of your assistance in raising him to your level, which can only be done by the co-operative creamery system. It is a mistake to suppose that you get more for your good butter, if others make it bad. Every pound of poor

butter has a tendency to pull down the price, and when butter is sold at 5 and 6c a pound, every farmer, to some extent, will have to suffer. Look at our cheese market. Since all its cheese is made good, we make ten times as much as we did a few years ago, and yet it is all wanted. As the quality improves, so the demand increases. This also holds good in butter. So many farmers feed turnips to their cows, and when they do that, it is impossible to make good butter, and for the little butter they make more, it does not pay, as it depreciates, the value at least five cents a pound. It is encouraging to see so many farmers attending these meetings, it shows that they have made the discovery, that they can learn something about butter-making. A few years ago they knew all about it. Prof. Macfarlane told us to-day how the skilful take plant food out of the air into the soil. A few years ago we found out that we can utilise electricity. It has always been around us, but we did not know how to use it, and so there are many things within the grasp of the dairyman, which come to his assistance to make dairying profitable, if he only opens his eyes and looks for them. This is, I think, the best attended meeting the Creamery Association ever had, and I hope the good seed which has been sown, will bring forth the best fruit. (Applause).

Mayor JANSEN.—In reference to feeding turnips to cows, I can corroborate that statement of Mr. Moyer's. I have sometimes tried to make myself believe that I could not taste turnips, but my wife invariably afterwards said she tasted them in the butter. I think Mr. Moyer is quite right, that it is impossible to feed turnips and at the same time get good butter. I was raised in Wisconsin and had more or less experience there of these things. I do it on a smaller scale now, and manage to keep but one cow, and invariably in the winter time have better butter than in the summer, and it is all because we have a kind of feed that makes the highest class of butter, and what we usually feed is corn stalks and carrots—not the common white field carrots; that is not the article for first-class butter; you want the table carrot. You will grow just as much of it as of the other if you go to work right, and when you get a bushel of it it is worth three bushels of the white carrots for butter purposes. Now, in fact you not only get a high feed, but also a coloring. You do not require an ounce of coloring matter in any shape or form in your butter if you feed these table carrots. (Applause).

AGENCIES FOR THE EDUCATION OF DAIRYMEN.

Prof. ROBERTSON said: I am very glad to be in Berlin to-night. I know that the townspeople are not so much interested in the dairy question, yet I want to speak of the education of farmers and dairymen, and if any good is done by what I have to say, they are welcome to put it into practice without paying any royalty to the speaker. Let me refer first of all to the educational value of the Ontario Creameries Association. Just five years ago this month the first steps were taken to form the Association at a convention in Woodstock, at the suggestion of Mr. John Hannah, who was persistent and persistent and again persistent in advocating the need for having the Ontario Crameries Association organised. I do think that the work of this Association is far more valuable to the Province of Ontario than that of others which are much more pretentiously named. We have the mayor of the Island City in Canada as our President, and I once heard him say in one of his moments of exultant exaltation that he would rather be president of this association than Governor-General of Canada. (Laughter.) My friend is always judicious in consoling himself; there was less chance of getting the other plum even if he wanted it.

This is along the line of melancholy history in Canada, that a few years ago our butter abroad had a fair name in England and elsewhere. It has not captured any markets in recent years. It is not because it has lost any of its strength. It seems to "go on from strength to strength continually." (Laughter.) Notwithstanding that, we have been beating a steady retreat from the position we once held. The history of the

cheese trade is quite different. It is more than twenty-five years ago since we opened up that trade, and it has grown to be very large and profitable. I think it has won for Canada the greatest name that has been given to us in response to any of the products we have sent abroad. Why the difference? Just this, we have been continuing to make butter of every conceivable variety. The shape and size and color of the package have been assorted. People do not like too much variety in butter. In our cheese factories we have been making ninety-nine per cent. of all our cheese up to a standard of uniformity, and we have taken on an average the highest place for excellent cheese in the world. England has no customer that sends so much good cheese; and she has no customer who sends so little good butter and so much strong butter as does our Dominion. (Laughter.) No doubt if we could put into practice in our butter making what we have done in our cheese-making we might win quite a superior place. England imports from us more cheese than she imports from any other country. She takes from us one-third of all the cheese she imports from abroad, but only two per cent. of the butter.

More education, more knowledge and more skill, and the putting into practice of the advantageous methods which are employed by the cheese trade, would help us to do as much for the butter trade as they have ever done in the past for the cheese. That leads me to speak to-night of the educational value of Experiment Stations, because I believe that through them we will lead the buttermakers of Canada to make butter so excellent that it will stand first. If we can make it as good as anyone else, we can have the longest line of profit, and if so we can afford to sell cheapest, and so command the markets. There will come a time, I believe, when butter will sell in England for less than the present prices, but the present price would leave us about twenty-six cents a pound for fresh-made creamery butter. Denmark sends over twelve million dollars worth of fine butter, for which she realises that price, and there is no place in Denmark that can compare with Ontario. Indian corn from the silo, fed with bran and pease, is the best combination feed we could have for butter making.

Very often farmers think that education is one thing which they do not need, as it will not help them in their calling. One says: "Oh! education will hurt my boy; it will stunt his desire for work, and make him seek the life of an idler." Now an education that will do that is of a wrong sort. Education is for the training and development of all the faculties and powers, and such help is as necessary for a man who works on a farm as for one who labors elsewhere. A mistaken notion measures the effect of education according to the use of big words, but that is not a sign of education. The man who does that at once proclaims his lack and need of literary skill, and skill is always a product of education. I will tell you a story about that. A very learned man in his own estimation, following one of the learned professions, came to see a sick boy. This man was a doctor. He seemed to think that education was proven by the use of great long words; so he said, "Boy, extend your lingual organ." That boy was never before aware that he was guilty of having a lingual organ. But the doctor would not come down from his high pedestal, to tell the boy what he meant. The boy's mother had good sense and was educated even in the use of big words; so when the doctor said to her "Madam, will you convey to the unilluminated consciousness of your youthful offspring the meaning of my language." "Yes!, Yes!," she said, and turning to the boy, "Johnnie, Johnnie, open your goblet and run out your lollicker." (Laughter.)

Now, farmers should first of all try to do more thinking before they do their toiling. Of all the things in the world which some men seem to dislike to do, that one thing is sober, honest, original thinking. Let me shew you; somebody's clear thinking underlies every rational act that brings success, and the more a man does the thinking for himself, the more he will be able to control his business for himself. When a man stumbles along and works toward no object, he may get some money, but farming is no speculation. Then farmers need not only to do more thinking, but they require to have higher aspirations. Why, farmers go through life often and complain that everybody looks down on them and nobody has any respect for them, and that they have to bear all the burdens, that they have to pay all the taxes, that they do all the drudgery, that they are the beasts of burden for other people. I would have the farmer believe

that his occupation is the noblest, in a material sense, of those followed by men who walk the face of God's earth. When a man feels respect for his calling his brother farmers will respect him and he will respect himself all the more. As soon as a man learns to do a little good thinking for himself he begins to find the dollars coming in, because then he puts himself into his work. No man can put himself into his work without getting well paid for it. A man gets a great block of marble and goes to work with chisel and mallet and says, "when the bell strikes five at night I will stop." So he goes on and does no thinking and has no aspiration. When he has finished, he can sell the whole thing for so much a ton to be broken up for paving the streets. Another man goes to work upon a block of marble and does some thinking. He starts by saying, "Is there anything I can bring out of it? I will strike with a purpose and will realise my aspiration to excel; I will bring out of the dead block a thing which will look back upon me as though it had life. If it does not reach my ideal I will be tempted to smash it into pieces as one man did because the lips which he had chiselled would not move." He can sell that statuary for any sum he likes to ask. Just as the farmer puts himself into the work and raises calves and cows and horses and gets back dollars in proportion as he applies the skill of a man. Then farmers ought to exercise more self-reliance. I find farmers saying the Government ought to do so and so. A Government can never legislate good times. You cannot find a case around the whole globe. Any good times that come in agriculture are from self-reliance and the favors of Providence in sending good weather. Self-reliance leads them to put themselves into their work by adjusting themselves to the changes that have come about. Then men need a little more self-reliance *to the very end.* I will give you an instance again. I find a man grappling with an undertaking and it is all discouraging; everything seems to be going against him, and by and by his courage weakens, his heart fails, he lets go on purpose. Such an one cannot do much. I never knew a man employed in any enterprise *that would persevere to the end,* who could not win success. There is no class who so often fail to do things right up to the end as the farmers. A farmer thinks it is all very well if he can get one cent a pound less than somebody else. It is just this little thing of persevering to the end that gains the big price and the permanent profit. With more aspiration, more perseverance unto the end, good times will come. And if an occasional poor season intervenes a man will have enough to lap over a season when the weather is not quite propititious.

Go across to Denmark and look back twenty years and you will find the people poor because farming would not pay, and they were discouraged. Somebody did something. If they could make winter butter to send to England and raise hogs and steers, that would make them money. Denmark is the most prosperous agricultural country in the world to-day, because of somebody's thinking and somebody's persistence unto the end. You wonder why I am not coming to these Experiment Stations. Now, these stations have been established for the sole purpose of directing and assisting farmers to do these four things, and then to furnish them with knowledge and conclusions which they could not reach otherwise so quickly and certainly.

Their occupation is a threefold one, a trade to handle tools; a business to buy and sell with profit, a profession to adjust themselves to the laws of nature and make these operate for their gain. We have no need to teach a man how to plow. The best place for education of that kind is at home on somebody's farm. I say there is no need for helping farmers to a business knowledge for buying and selling with advantage. The home and home training should fit every man for doing that in the best way, and the farmer who excludes his boy from doing business until he is twenty-five years old has done his boy a great wrong. They should have their boys on the farms transacting the simplest of the business at first, and giving them experience in all buying and selling required on the farm. If the boy, the first time, loses ten cents a bushel on the grain don't be afraid to give him another chance. He will take good care not to do it again and it will be a better lesson to him than if he had made five dollars. In that way give lessons at home. But in the profession of agriculture a man needs some outside help. Let me show you how we are trying to give that from these Experimental Farms. First of all we are trying to show that nature is very generous; all the time trying to bestow

blessings on her children when they follow the paths she has laid out for them. One illustration. In sowing two-rowed barley it will give you a larger yield as feed for cows when sown on well-prepared land and in good time. Last spring she gave us back for barley sowed on the 22nd of April forty bushels to the acre, and when we sowed the same kind of grain one week later, on the 29th of April, she gave us back twenty-four bushels; and of the same kind of barley sowed just one week later, on the 6th of May, she gave us back sixteen bushels to the acre; and of that sowed on the 13th of May, fourteen bushels; and on the 21st of May ten bushels; and on the 28th of May, eleven bushels. Some men complain because they cannot grow enough grain for their cows while good Dame Nature is waiting to throw it into their laps. In the same way she gave us back of oats sowed on the same dates, with intervals of one week, in the first instance thirty-seven bushels, in the second thirty-three, and the third thirty, and the fourth twenty-seven, in the fifth twenty, and in the sixth seventeen. You see how gradual the shrinkage goes on when men have not enough business knowledge, professional skill, to make nature serve them in the best way. Then besides that we are trying to show farmers how to feed in the most economical way so that the feed will cost less than the product of the animal will sell for afterwards; how to best combine the growing and feeding of crops so as to have the best value in butter at the least cost. People somehow or other don't like to pay twenty-five cents a pound for butter that has only one good object in the family, that of saving bread. (Laughter). Now, butter that is made from turnipy milk will save at least half the consumption of bread among people whose taste is at all delicate, and the effect of half the bread being saved would be that half the flour would be saved and only half the wheat would be in demand. Then the wheat would go down from one dollar to fifty cents at once. (Laughter). Let me give you another illustration showing how the improvement of our butter will help every single product of the farmer to fetch a higher price. A young man got married and after his wife had got through saying nicely buttered things to him she noticed with an economical eye that he buttered his bread very extravagantly. She said "John don't you know that butter costs twenty-five cents a pound." "Yes, my dear," he said, and with that he folded the slice and buttered the other side, "and I think it is worth it." (Laughter.) He was not going to reduce the consumption for any such reason as that.

But to show you how we do this work in connection with the Experiment Stations, let me give you a very short outline of the area we attempt to cover and of the different lines we attempt to take up. First of all you have here at the centre of the Province of Ontario, an Agricultural Experiment Station in connection with the Agricultural College at Guelph. For fourteen years that Experiment Station has been trying to shed its light out into the homes of the farmers of Ontario, and some of have welcomed its beams, have accepted the teaching and are now grateful for the help. But many of them have screened and shut their eyes while their neighbors around them were reaping these advantages and they have looked upon it with suspicion because it was a Government institution. The first summer I spent at that Experiment Station I began to test the effect of salting the milking cows. They were salted every day and gave fourteen and a half per cent. more milk than when salted once every ten days. Fourteen and a half per cent. means a great deal on the herds of Ontario. Your good friend, the chairman, introduced me as being connected with this institution, I was proud to work in the dairy department there, because of the useful work it has done, and there has been appointed to succeed me at Guelph Mr. H. H. Dean. Mr. Dean's whole heart is in this work. He has been a popular and successful student, and he will leave nothing undone which he can do to make his work valuable. I hope the farmers throughout the Province will give him a fair chance, and I am sure he will render the farmers of Ontario abundant service along the line of his own department. Now we have other stations. We have at Ottawa a station called the Central Experimental Farm. There we have nine breeds of cattle; we grow all kinds of grain and grasses and roots and fruits and trees. We grow scores of things for the sole purpose of finding out for the farmers things they cannot discover for themselves. I went to Nova Scotia starting down the beautiful old St. Lawrence river, that most magnificent, noble stream. I then went up that weird river called the Saguenay. I may tell you that one man drove sixty miles to get one day's education in cheese-

making. Some months afterwards I heard that he had been able to sell his cheese for one cent per pound relatively more than he had ever done before or than any other factory in the county was doing then. Then away around from there past Riviere du Loup I went down to the Bay of Chaleur and away up around to Gaspé Bay. The people from Jersey, Ireland and Scotland are making butter and selling little else but that and oats. In New Brunswick I found a few cheese factories prosperous and paying well. Across the Bay of Fundy up the Annapolis valley, the people have no cheese factories. You know there are always laws of compensation. The finest fruit grows there and the owners of beautiful orchards have an excellent reputation for their apples. Then around to New Glasgow and down the Antigonish valley where Mr. Archibald started a cheese factory some years ago. There are now eight factories and they are building more this year. Then I came back to the Nappan Farm, and what we expect from that is to show the most skilful way of carrying on farm work including the making of butter and the most skilful way of making it through summer and winter. Then a journey was made to Prince Edward Island, that gem of the provinces of the Dominion, with its softened contour and deep beautiful colors with the soil as rich as its products, grass as green as the slopes of Ireland and a sea as blue as the canopy of heaven. It is the best place you see (except Brockville) for getting fine cheese. (Laughter). About fifteen years ago one started a cheese factory and because some people had not done enough clear thinking, the whole thing fizzled out, but now we hope to put an experimental dairy station there, and we have applications from several persons to get one summer's education in factories in Ontario. They will go back taking knowledge to those people. Then I returned to Quebec, a wonderful province. Four years ago the cheese of Quebec was sold at one cent a pound less on an average than that of Ontario, and now I can find factories that are out-selling even factories not far from Brockville. (Laughter). The Government of the province of Quebec has arranged to pay half the salaries of fifteen travelling instructors to educate the people. Then across the province of Ontario. I could show you in this province people who will persist in boarding 200,000 dry cows all winter for the fun of it. They should make butter then when it can be made just as fine in body as when made from the best June grass, and have it sent across to England. Then out in Manitoba we have an Experimental Farm doing work for that province similar to the work that is being done here. In this province with its capacity for sustaining two millions at least, we are trying to find out what things will grow and what kinds of farming can best be carried on. And far across the plains we have a farm at Indian Head. Coming across here we come to a settlement of Icelanders apparently contented with their conditions of life up there. In most of their homes there were two shelves of books —these are men who do their thinking, men who are self-reliant, men who are persevering and must always win success there or anywhere. People who are make-shifts have hard times of it anywhere. They have built a church, and have one of their own clergymen from Iceland. One said "Vell, we are almost as enterprising as the English people ; our church is built and painted outside and inside and paid for, but we haven't put a mortgage on yet." (Laughter.) So that this is self-reliance and perseverance to the end. When I was coming to this place I went up to inquire my way at a house. I could not see any curtains on the windows or flower plants. so at once concluded that no woman lived there. Then I saw a clean churn standing at the door, and I thought a man would not clean it so bright. Then afterwards I thought there must only be a man, because the whole week's washing was strung on the clothe's line—just one collar (and that barely clean), in the middle of the line. (Laughter.) After all, these people in Manitoba who have to do the dairy work themselves as well as the outside farming, are all the time crying out for creameries. The men all over that country want to make butter and cheese to be safe against the disaster of frost.

Away out here is another Experimental Farm, just beyond the Rockies. Then down here in Vancouver Island they are selling butter at fifty cents a pound the year around. So from one end of Canada to the other the people who keep the most cows make the most money, and where they keep them milking the year ar und they make the most money from the cows they keep. So the whole trend of the work of this Association is to help the farmer to do more thinking, to have more ambition and a little

more self-reliance, and to make from his own business not merely more money for himself but help to make times better all around. I have this to say in conclusion. If any one at all wants help from these Experiment Stations, they exist for the purpose of helping the farmers. It is not counted trouble to answer letters of enquiry, and as the farmers get their eyes quickened, their intelligence enlarged and their judgment strengthened they will be fortified in their efforts to make this country from shore to shore the best in the world, and when our farmers are prosperous then everybody will have good times. (Applause).

The PRESIDENT.—I may say that I am perfectly delighted with the meetings, not only to-day but this evening. I was glad to hear the addresses. The last man that has spoken is a gem in himself, one that this great Dominion may well feel proud of. There is no man stands on the continent, no professor, that has the same knowledge in the dairy business that he is now trying to educate the people so thoroughly in. Our good friend Governor Hoard did his very best to transplant this man to the Wisconsin soil in order to educate his people in the best dairy thought of the land, but on the urgent solicitation of his friends he was induced to stay here to educate the people for this great dairy enterprise we have in hand.

Votes of thanks having been tendered to the speakers and chairman, the convention, led by the orchestra joined in singing the national anthem, and then adjourned until the next day.

SECOND DAY.—MORNING SESSION.

The President said he must apologise for the delay which had taken place in opening the convention this morning. Through the kindness of the Mayor they had been driven about the town and taken through several of the large manufacturing establishments. "We thought we could see all the institutions of importace in Berlin and be here ready to go on with the work by ten o'clock; but notwithstanding all possible haste, you see the delay that has taken place, and yet we have not visited half the grand institutions in this locality. I am perfectly surprised at the large and interesting industries located in this town."

AUDITORS' REPORT.

Mr. R. J. Graham, the Secretary-Treasurer, then read the Auditors' report, which, upon motion of himself, seconded by Mr. Robert Philip, was adopted. It is as follows:

Receipts.		Expenditures.	
Membership	$82 00	Expenses of directors at board meetings, etc.	$254 45
Balance on hand as per last audit	524 50	Expenses of instructor and salary	596 65
Grant from the Ontario Legislature	1,500 00	Premiums awarded for butter at exhibitions	175 00
		Printing account	86 00
		Reporting Seaforth convention	50 00
		Secretary-Treasurer's salary	100 00
		Postage, stationery, etc.	29 15
		Lecturers and expenses of Seaforth convention	50 00
		Balance on hand	765 25
	$2,106 50		$2,106 50

We the undersigned auditors have examined the Treasurer's accounts with the vouchers produced and find them correct and a balance to the credit of the Association of $765.25.

J. M. MORGAN, } Auditors.
J. S. PEARCE, }

Berlin, February 14th, 1891.

ELECTION OF OFFICERS.

Mr. AARON WENGER presented the report of the Nominating Committee as follows :

President : D. Derbyshire. *1st Vice-President :* Aaron Wenger. *2nd Vice-President :* John S. Pearce.

Directors : John Croil, Aultsville ; J. M. Burgess, Carleton Place ; T. J. Miller, Spencerville ; John Sprague, Ameliasburg ; Robert Philp, Cadmus ; M. Moyer, Toronto ; Geo. Harcourt, Guelph ; W. G. Walton, Hamilton ; John Hannah, Seaforth ; Erastus Miller, Park Hill ; J. N. Zinkann, Wellesley ; T. Brown, Holstein ; Arch. Wark, Wanstead.

AARON WENGER.
JOHN SPRAGUE.
JOHN HANNAH.
R. J. GRAHAM.

Mr. WENGER moved, seconded by Mr. A. MILLER, of Brockville, that the report be adopted, which was carried.

The PRESIDENT.—I take it as a great honor to be elected to the position of President again. There is no position in the province of Ontario that I would sooner have, because I believe it is the most important position that any man could aspire to. It has such great possibilities that I feel I can devote a great deal of time to the duties and in this way do something for the great province of Ontario. I thank you for this kind treatment here amongst strangers, and I shall always remember it with the greatest gratitude. I will now introduce to you Professor Robertson, who will speak to you on the subject of dairy farming.

WINTER BUTTER-MAKING.

Prof. ROBERTSON : Mr. President, ladies and gentlemen, I have been very much gratified this morning in being driven around the streets of this thriving town of Berlin. We people, who spend most of our thought and nearly all of our time in trying to provide food for the working people who in turn furnish other things that we need, too often forget that the prosperity of our country depends not alone on the success of our farmers but on the thrift and enterprise of those men who even make the buttons for the farmers' coats, the shirts for his back, the shoes for his feet and all those other things which we have seen in process of manufacture this morning. Yesterday I told a friend of mine that the population of Berlin was about six thousand, and I felt that I had almost been stretching, but now I find you have nearly eight thousand people, and that your throbbing manufacturing enterprises enable you to make every township and county in Canada pay their tribute to you, because your goods go clear across from our shore of the continent to the other. I want to say in this connection that the closer the bond of sympathy between people working in towns and people working on farms, the more will we be able to help one another and to enjoy even privileges. Very often the countryman thinks the townsman is a man who waits to take advantage of him at every turn, and the townsman often thinks that the countryman is a fit subject to be skinned right down close every chance he gets. When we know each other better we will be able to work together more harmoniously for the advancement of the many interests of our one Dominion. This morning I will speak to you upon one aspect which will promote our common happiness and prosperity, that of making more and better food in the winter time. The task and occupation of the farmer is to devote his talent and strength to solve these problems that face him in such a way as to bring back from nature as much as possible all kinds of food which contribute to the support of the race to which he belongs. Now, a man who follows dairy farming and provides food for the people during the summer months only is like a man who owning a button factory shuts it up for the winter saying, "Closed because the winter is cold." With all the plant idle, all the hands discharged, no income throughout the winter months he could never compete with another button manufacturer up in Port Elgin that runs all the year round. No more can a farmer in

Waterloo compete with a farmer over in Wisconsin or in England who keeps going all the year round and has an income all the year round. Now, winter dairying has nothing in itself that is hostile to summer dairying any more than shirt-making in winter has in it anything that is hostile to shirt-making in summer. Perhaps you make a different class of goods, that is all. At the same time business should run the year round in both instances. Farmers have come to this experience in their calling, that their profits are threatened with annihilation. Times are hard — there is no question about it—and times are hard upon the farmers whose occupations lasts only half the year. Times are not hard with farmers in Ontario who keep their business going and sell products in the summer time and fatten and sell steers and other stock products in the winter and spring. These men have been doing well during these past ten years when times were hard. Now, a dairyman who has no fat steers to sell can do something else. The point is, can we begin winter dairying without much further outlay? A Creamery Association is just an organisation which takes hold of this new problem and helps the farmer to solve it. A man who runs a creamery for only five months in the year will find his patrons becoming thoroughly dissatisfied with the receipts from their cows. It cannot pay a man to feed cows for twelve months from which he obtains cream for only five months; and the man who runs a creamery can never afford to make a profit out of the losses of his patrons. Put that down as a solid fact. And the man who furnishes skill and turns around and helps to make the profit of his patrons larger will get a larger share for himself. Now, if a man running a creamery will try and extend the season for a few months more he will find he will get so little cream that the running expenses will run away with the profit. You need not begin to advocate winter-dairying until you educate the farmers to feed their cows so that they will give milk during the winter. You want to begin at the foundation, educate the farmers to feed their cows so that they will give milk and send it to the creamery. Then when they have abundance of pay coming in regularly all winter, they will have money to pay their current expenses and it will not take them all summer to pay the accumulated grocery bills of winter, but they will be ahead and the summer will leave them more profit. I have said that much by way of preface to try and remove any misconception that winter dairying has any hostility in it to summer-dairying. Now, put this down as my second proposition, that the price of butter in the summer time is one factor in a farmer's business over which he has almost no control. A man, twenty men, fifty men, five hundred men, can never, by any manipulation, raise the price of creamery butter in summer by one cent a pound. But creamery butter fresh made will sell on the average throughout the winter for about a half more per pound than it will from June to September. A man has exclusive jurisdiction over that factor. He can make creamery butter from June to September and take the prevailing price then, or he can make from September to June and get the prevailing price then. Then put this down as my third proposition, that the man who lets his cow go dry for seven months of the year will get less during the other five months of the year and will get less during each of these seven months when she does milk, than will the man who makes his cows milk not seven, but ten months in the year. Men say if they milk their cows all winter they will get a smaller flow in summer. As a matter of fact, they will get a larger flow during the summer months. A cow that goes dry in the winter time that is fed upon dry food will have her system so ill-adjusted for milk-making that she will give less milk in the summer. Take these charts now. I will take the Jersey cow, not because she is the best cow, but because the ideal form is easier described on this contour. The form of a cow's body will reveal both its capacity and power for making milk to the eye of the skilful judge. She is a milk-making machine, adjusted even in regard to the economical contrivance of her body for appropriating bulky food, here (the mouth) coming out in the concentrated form of milk at this end (the udder). Now, if allowed to become dry, she may not be so well developed here (the udder), and in a short time you will find that she drops off in her milking because she is not developed into the form for giving milk. In your heifers, the first season develop these parts of the body and thus make your means better adapted for carrying on your work. Let me give you the points of a cow and show how she can be assisted for the enlargement of her capacity for winter dairying.

Beginning at the most valuable one, you know a large udder is desirable and the points of excellence are first length, then breadth, and then elasticity—softness of quality. This is a very peculiar and mysterious laboratory wherein the cow changes the blood of her system into the milk she gives the dairymen. The next point to look for is a soft mellow skin. Any one knows that a steer will thrive better if he has a soft mellow skin. A man who feeds his cow well through the winter on succulent food discovers that the cow has a skin more mellow and soft and unctuous. The skin is a most important organ which goes around and through the cow's body, the only interruptions being in the stomach. The digestive action depends upon the activity of the internal lining of this canal, in pouring juice upon the food in the stomach and then in assimilating the food after it is partially digested. Any treatment that will make the outside skin more mellow, more movable, will give you a better cow. The next point is a large barrel with ribs broad and wide apart. By the use of bulky and nutritious feed you will develop and conserve the digestive power and augment its potency. A cow that lives all winter on straw will find, in the spring, that she has been reduced so much in her productive capacity by having to wrest nutrition from this straw that she has got into the habit of wasting things. That cow won't give you so much milk all summer. Then a cow needs to have broad loins and long rumps. You cannot change this, that is born in the cow; but you can do this, if you keep on developing the milking qualities of any cow, you will find that her progeny—her calves—will very soon have the long rumps and broad loins. Then you will have better bred animals for giving milk. The cow should have a rather long fine neck, fine quiet face, with large eyes. Did you ever see a cow with a short neck that milked a long time? I do not think I can ever recollect a beefy-necked cow that gave milk for a long period. The object simply is to show that a man by giving a cow some chance will develop in her just the form that will help her to give the largest possible quantity of milk for the longest possible period. It is a good practice, because it is in accordance with a man putting himself into harmony with the laws of the universe which, when he does that, will shower blessings on him every time. The cows that milk through the winter, or ten months in the year, will give more milk per head than a cow that only gives milk for six or seven months, and when a man gets more milk per head he will find that he has larger profits and then he will keep more cows. I will repeat what I said yesterday, that I think every dairyman who has a hundred acres of good land should keep, at least, twenty-five good milk cows. Now, how will he get the cows? The trouble is if he milks only in the summer time he will not raise many calves. You will find this all over the country, the man will raise the winter calf seven out of eight times. I would not advise a man who has twelve cows to buy thirteen more, but by having winter calves, if he will rear these, in three years' time he will have twenty-five cows. I would have things adjusted to feed those cows, by growing corn and filling silos. In that way I would put myself down as saying that every cow would bring me in each year, at least, $50 on an average. One man down near Brampton, for three consecutive years, by making butter and selling it in Toronto, had receipts averaging $73 per head. He had $72 one year and $75 another. This was from twenty-eight cows. He had private customers and sold at twenty-eight cents per pound. Then not merely will you have more cows for milking. Half of the calves are bull calves. Well, why should the farmer kill his bull calves when all the year around people are clamoring for beef of good quality. I remember a story of a man who suggested that the beef should be graded as they grade wheat in Manitoba. This man got a piece of an old ox and tried to cut it, but the knife and the beef seemed to be ill-adapted to each other to the end of bringing about separation. He suggested to the proprietor of an hotel that if they graded their beef as they graded their wheat this should be graded as number one hard. (Laughter.) If calves are raised through the winter they can be fattened rather more rapidly, coming into the market in capital shape when they are two years old, and the dairyman who grows lots of corn can fatten lots of steers and add income in the spring in this manner to summer and winter dairying. I want to say this also, that the man who sells butter through the winter will get for that butter *a constant demand* at a good price. He will have some trouble at first, but there is an unlimited demand for excellent butter in

large centres of population. Mr. Moyer stated they were paying twenty-three cents in Toronto for butter which is adapted to the want of their customers and that they get a butter which they could not sell at five cents, or even give away. Meanwhile if we could send across a weekly shipment of butter to England, we would get the Danish prices netting now twenty-six cents per pound. In 1886 I went to the Colonial exhibition. I had some butter from the Ontario creamery. It did not get there very well, and was kept at the exhibition until it was unsuitable to be sold as first-class butter, and yet I think it sold for 108 or 110 shillings; but a capital shipment was sent through afterwards and that was sold at the price of Danish butter, and every year since I have been asked by the firm who bought that shipment to send from three to five hundred tubs and I could charge what I had to pay to get it. There was no limit. Now one point more. It is very hard to get farmers to go into this business so I will tell you what my own view is of the best way to go to work about this thing. You will find first of all that the farmers will hardly make their cows milk through the winter and send milk to the creamery at first unless they have positive proof that creameries run in winter are to be a success in our country. Farmers are rather timid in going into anything they do not understand. If a man comes along with a first-class humbug they will go into that straight, but if a good thing comes along they are the most conservative class of our population. The farmers say, "Well, we don't know exactly how well the Canadian-made butter would sell in England; it might only sell as second-class." Farmers don't believe that winter dairying by supporting the creameries would pay very well. They say that "we don't know that England would pay us high prices for our butter." I would like to see in Ontario, at two points perhaps, and in each province throughout the Dominion such an experimental dairy established as would endeavor to discover the best methods of making of cheese; to find out how to solve those problems in that difficult process of cheese-making. Then I would propose to have these same buildings used for making butter all winter, and having the farmers in those sections send their milk to the factory to be made into butter and taken to England. This butter might be shipped every second week or oftener, and if at first it does not sell high I think the Government has resources enough and interest enough in the dairy business to be able to stand all the loss on weekly shipments of fresh made butter for four or five or twenty weeks until we establish a reputation in England and let the people know that our butter is excellent. The whole thing will not come at once, but when people see how this will take then I dare say twenty more factories will start up and this will become a source of influence to help the farmers throughout the country. Now I do not see why we should not do that this coming winter. If to the men whom the farmers send to Ottawa to vote their moneys, to make their laws, to help to develop the interests and resources of this Dominion they would say—"We want that, we are going to have that"—the members of parliament would say, "Yes, you will have it." We have in this Creameries Association with all the power behind it an organisation which can say "that has to come this year." So I would like to see you pass a pretty stiff resolution, if you want that, if you are bound to have it. And if you don't get it, then I suppose you will have to do as the good old woman said when she was in trouble. She said she always got some consolation when everything else failed by trusting in that promise: "Just grin and bear it for a while." Let me say a few things as to how this winter dairying presently can be carried on advantage in the farm home, because in connection with that same scheme of helping with farmers to make butter in winter by furnishing milk to creameries I would like to see the farmers helped in some practical way to make more and finer butter in their own places. Notwithstanding the importance of the creamery industry and the advantages that grow from its development I think one half of the butter will be made in home dairies for some time to come—in my lifetime anyway. From isolation of settlement, from various causes, about one-half of all the butter product in Canada will be made in private dairies. Now I think that the farmers' wives are eager to learn when they get a chance and I think the farmers' wives are able to make the very finest butter when they get a fair chance, but I think the trouble has been that the men have had all the good things. They had to have the horses and the reaping and mowing machines and the driving sheds and everything else they wanted while their wives had to get along with

one pantry for keeping the milk, the butter, the cold vegetables, the pies and everything else. There the cream took in the mixed flavor. Now if the farmer would give the wife a small milk house I will warrant that it would be kept far more tidy than his driving shed, and she would take such a pride in it that it would make a man look after his own business. Then go around and see this woman struggling with an old-fashioned churn, working twice as long in churning the butter as there is any need for, and until it is not so nice as it would be if churned more rapidly, all because this man had to buy a new top-buggy and to build a new driving shed, etc., never thinking that his wife should have her strength spared and the needs of her department provided for. Get rid of these old-fashioned churns and milk houses and you will revolutionise the butter trade at once. I am not in favor of strikes, but if I could reach the ears of the good women that are such an ornament and joy to the households of Canada I would have them strike and say, "We won't do anything until you give us new milk-houses and churns." Men would likely stand out for a while, but they would have to give in. (Laughter.) I would like to see a scheme inaugurated throughout all the provinces and clear across our whole continent whereby one man or two men in each province with a capital equipment of dairy apparatus loaded on a travelling waggon would go right to every township and spend one day at one end of it and another day at the other end of it (letting the people know beforehand that they were coming) and show the nicest butter prints and other dairy appliances and practically illustrate and demonstrate the best way of making butter. How much would that cost, do you suppose? Each man would cost say $800, and for two $1,600. In this province there are about 200,000 farmers somewhat interested in dairying. How much would that cost? Less than one cent apiece. I think this would induce the farmer to get his wife a new milk house and a new churn. I find if one woman gets a nice, attractive, cheap dress twenty more women want to get the same thing, and if one woman gets a nice, new milk-house and churn twenty more women give their husbands no peace, night nor day, until they get that new milk-house and churn also. This would bring very much good to the dairy business. Now a very few facts about the making of butter after it has got that far. The cow elaborates the milk in the udder. You have blood coming in by the arteries at the top of the udder, which is composed of two glands lying lengthwise. Peculiar cells line the inside of the lactiverous ducts down which the milk trickles to the milk cisterns at the tops of the teats. In each cell a formation grows that is almost like a tiny bud. That bud by and by drops off and trickles down with the liquid milk. These buds are the globules of fat from which all butter is made. They float in the milk. Milk is practically all soluble except these globules and these are held in suspension in the liquid of the milk. They come to the top when the cream rises because they are lighter than the serum, but if a person after milking leaves the milk in the stable until the temperature goes down to sixty degrees these globules do not get through quite so quickly. Changes occur which make it almost impossible for these fat globules to gather to the top, either so completely or so quickly as if the milk were set in cold water immediately. To give an illustration. A man gets into the habit of doing nothing for an hour after breakfast every day. He will by and by want to take an hour and a half and by and by will become an unskilful, lazy man all day. Get into the habit of setting down the milk pails for half an hour after milking and these globules follow his example, since the man whom they are trying to serve is not trying to hurry. So in that way you will just find that inanimate nature always responds to man's activity or to man's slowness. The centrifugal machine is meant for the same purpose of separating the cream. It swirls around very fast and the heaviest parts of the milk are thrown to the outside and the lightest parts to the inside. Meanwhile if a man cannot use that—and for some time it will not be in common use—every man through the winter time can get plenty of cold water, as ice is very easy of access. Cold water can be gotten very easily, and if you put the milk pail into cold water you will get off the cream very quickly.

What about this bad stable flavor that never comes in milk from a cow that is fed on wholesome food? If you feed a cow in the winter time on turnips you will

have a turnipy flavor. Every man should have a well ventilated stable, but not two well ventilated, not so well ventilated that in January those winter zephyrs will find their way across the cow's back ; but a fairly well ventilated stable that keeps the cow healthy. When the cow gives the milk it is warm—between ninety-seven and ninety-eight degrees. At that temperature milk will evaporate and nothing can settle on it so long as it is steaming, but if you leave it until cold it will absorb the stable flavor. If you attend to this matter of quick setting you get two gains, more cream and butter and a better quality of both. A man never does the right thing without getting two or three consecutive rewards for it. Unmeasured are the advantages of doing what is right. Then a very few words about the effect of churning. In making butter at home one can all through the winter churn once a week only if need be, and have the butter of exquisite flavor. Thus, you see, there is a great deal of labor saved by churning one day a week instead of three. That can be done in this way: if the cream is quickly cooled until it stands at forty degrees and is left cold until one day before churning, and then warmed up gradually to seventy degrees, and has added to it a small portion of sour cream or sour skim milk, the cream will churn easily and save all this trouble of churning and washing of utensils three times a week. Keep the cream at a temperature of forty degrees, raise it to seventy degrees one day before churning, and add about two per cent. of sour cream or sour skim milk. No man can afford to churn without a thermometer. He might as well shut his eyes and try to guess the color of the necktie of the next man. This plan of trying to tell the temperature with the fingers is no use. If you will do these things we will find that dairying in our country will begin to take the place it should have in our agriculture. It will be the one thing to which all the rest of the farm work will mainly tend, and the selling of concentrated products will pay far better than hay and coarse grains. A man can concentrate more skill and labor in a ton of better which at twenty-five cents a pound, is worth $500 than he can load into an equal weight of hay. Besides he need not load into $500 worth of butter one-tenth as much of real hard manual labor as into the hay required to fetch as much money. It will leave more time to think, and thought always sells dear in products. So instead of going on blindly grinding out blind results by merely following the men that have gone before us, we will find Canada certainly the best place to make milk and butter—summer for cheese mainly, winter for butter mainly. The raising of stock in winter and the fattening of swine in summer can be combined, and then along with these sheep and horses can be reared. The more of these products and animals, and the less hay, grain, and straw we sell, the richer we will keep our farms and the farmers will become wealthier than before. Along that line I believe winter dairying will come, and when it does come we will wonder why we have been foolish so long. (Applause).

Mr. Moyer—The farmers around this part of the country all raise turnips, and seem to think they connot get along unless they feed them, Now, when we go into winter dairying I think this should be stopped. There is one other point which I think is of very great importance, which has not been touched upon at all yet, and it is a very simple one ; that is the salting of butter. I find many people use common barrel salt, and very often you will find lumps of it in the butter. That depreciates the value of the butter at least two or three cents a pound, and fine salt can be got costing very little more a barrel. People should use nothing but the very best of salt for butter-making. The ordinary barrel salt is not fit to be put in butter, and by saving a fraction of a cent on salt they loose from two cents to four cents on their butter. I believe that three-fourths of the butter that comes to Toronto is still salted with this common salt. Now I want a little light about ripening cream in the winter time. I think that at about forty degrees it will keep in perfect condition for a week, but after it stands three or four days there is a change. There is not the same change as in the summer time when the heat makes it sour. I learn from experts every day that if we let that cream stand for three days and then use it on the table it has not that nice sweet flavor when fresh, and if that is the case it must certainly injure the quality of the butter. Now, I do not know whether the idea of putting in sour cream before churning will work, because this sour cream must have been injured by some chemical change which I cannot explain to you, but I know it takes place. I have suggested to several of our makers the idea

of ripening quickly by heating the cream right straight to a temperature of over sixty degrees. It will then get acid in a very short time and perhaps the butter will have a better flavor. But I would like to know what chemical change goes on in the cream, when it is kept so cold, after standing for two or three days.

Prof. ROBERTSON—As to feeding turnips, the volatile oil in them seems to find its way into the milk and give the same taste in the butter, and it cannot be smothered or gotten out only in a very limited measure. So the safest way is to never feed milking cows on turnips. In the matter of salting, any salt that is pure, that will salt to the taste but which you cannot discover in the touch is all right. You want to have the butter taste of the salt, but never to feel it, because it should be all dissolved, as it will be if you use a pure velvety salt. In the matter of cream, after standing a while it will taste old because of certain changes from certain fermentations that go on at low temperature. They make old cream lose its freshness, but the butter from that is the fat mainly, and the fat seems to be unchanged. I find you can have as fine butter from cream which has been kept a week in the winter time as from fresh cream. Now a word about fermentation starting. It seems that there is in cream a certain amount of what is called the sugar of milk. Now there falls into cream from the atmosphere some of those spores that you see in a barn when a beam of light is striking through a crack. These things are falling into the cream all the while, and many of these start fermentation just the same as when yeast is put into bread. Now the sugar becomes changed by the activity of these germs. But that kind of fermentation does not work very well except between sixty and ninety-eight degrees, and then if above that temperature does not work so well. If your cream is kept at one hundred and fifty degrees it will not go on at all, so that if you kill these germs and protect it from receiving more of them you can keep the cream as long as you like. It will keep for a year if sealed, so far as sourness is concerned. Other fermentations would cause it to spoil and decay in other directions. Now, if you have it exposed in milk pans, there will be going on in the milk when at sixty or seventy degrees, lactic fermentation. Then it gets sour fast enough. If you keep it at forty degrees it does not go on at all, and if you increase the temperature up to sixty it goes on slowly. Therefore, in the winter time I put in a small quantity of sour cream because the quicker you can sour the cream fit for churning after the souring starts the better.

Mr. HUNTER—Is it not possible that the butter extractor may revolutionise the whole and do away with the exploded theories as to the handling of cream carefully so as not to burst the globules of fat. We have had a machine placed in our factory. Scientists are opposed to that upon the ground that the butter globules are injured, and advocate a revolving churn of some sort without any dash whatever. Now, how are we to get into the right position amidst all this. I am using a centrifugal machine in my own work and my experience is that there is no necessity for waiting for the cream to ripen. I would like to ask what is this ripening? Is it not the first stage of decomposition. We have run the fresh milk through the machine and churned it and have got a first class quality of butter. Some of this put by in August in tubs we are using in our families. It was put up in butter tubs, not quite salted sufficiently for tub butter, and though it is not quite like fresh butter made yesterday, it is what would reasonably be considered good butter. Now, why this waiting for allowing any taint or anything else to affect the good flavor of the cream. I am satisfied that we will gain by any shortening of the distance from the milk pail to the consumers.

Mr. WENGER—Have you not found that you did not get as much butter from the sweet cream as from the sour?

Mr. HUNTER—Yes; I would say that. We have by churning the cream at a reduced temperature.

Prof. ROBERTSON—My experience is this, that when the cream is sour I get rather more butter from churning sour cream than from churning the same cream sweet. One illustration: At the creamery at Guelph we put parts of one lot of cream into five bottles and churned these at different degrees of acidity. We had the buttermilk

analyzed in all cases and I found that there was recovered by churning sweet cream only seventy-seven per cent. of the butter fat. In another I got ninety-seven pounds out of a possible hundred when churned far too sour to make the butter nice. You can strike the mean and get the most and the nicest butter from cream slightly sour. There was some difference of opinion as to the method of churning with regard to the bursting of these globules of fat. So far as I know, they merely float in the milk and all we require to do is to get the cream in such a condition that they will come through and strike and stick. The acid seems to facilitate this object. Then, another point is this; it has been said that these globules of fat are injured by slow or fast or some other kind of churning. They are so small that I have never known any kind of mechanical movement to injure them. Fifteen hundred of them would lie together like a row of marbles and measure less than one inch. But the least change of temperature will change them very much; so that the grain of butter is nearly always spoiled by the temperature and not on account of the movement. Then, while the souring of milk is in a certain sense decomposition, it is not what you would call putrefactive decomposition, and the lactic acid which is formed is itself a germicide which will destroy certain other spores. For instance, if a man makes a cheese sour it will keep for two years without decaying and will keep so long and be so hard that he is allowed to keep it all the time. (Laughter).

Mr. Thompson—What is the effect of light on color?

Prof. Robertson—Light will always make it brighter. At the same time more lactic acid germs get into the cream. Rather than brighten the color by the action of light I would put in a little coloring and make it yellow or brown as my customers preferred. (Laughter).

Mr. S. C. Clark—Would it do to use buttermilk instead of sour milk or sour cream?

Prof. Robertson—In buttermilk you have something you have had through the churn before, then if you put it through the churn and have it in the buttermilk again you will find other fermentations which are apt to produce a peculiar smell which buttermilk acquires after standing for a long time.

Mr. Thomas Brown—You refer to the temperature being lowered by the milk standing for some time. Would raising the temperature of the milk to its normal state cause the cream to rise equally well. In regard to that there is another thing that is recommended, that we add from one-third to one-quarter of water, and there seems to be a contradiction about this.

PACKAGES FOR THE HOME TRADE, AND TESTING CREAM.

Mr. Aaron Wenger was next introduced. He said: There are a number of packages in the market. First of all you know the old-fashion firkin used in this market, with both ends loose. Then there was the old-fashioned hand-made tub. Subsequent to that there was the spruce tub, made by machinery in Quebec, and subsequent to that again we had the tin-lined tub. Now, these are all good packages for the export trade. For the export tub, however, I prefer the tin-lined and the firkin. There is no soakage, and, with a good salt paste on the top, it will keep the air from the butter. Then some makers prefer the spruce tubs to suit some of the English buyers. They have been in the habit of receiving the butter in this shape, and the English market is very conservative, but I find the tin-lined tub keeps the butter better than the spruce tub. Now, as to the home tub, some of these are good. Some people want a small package of butter to last two or three or four weeks, and many of the dealers want those tubs. Outside of that we have a little package brought before the public by Mr. White, of Belleville. These are made of white wood and tin, being lined with paraffine inside which renders them perfectly odorless and tasteless. These are good packages for the home trade. Then we have the pound prints. But the trouble that I have found in my trade is in making these prints. It is a very nice way of putting up butter, but the additional expense of keeping men to make these prints and of sending butter in that shape to the market means a good deal of expense and loss of shipping cans.

My experience last season was that if I had packed my butter and held it for later sales I might have made more profit. My creamery is run on the cream-gathering system. In place of paying for the cream as it comes to the factory I was led to the discovery that there was a great difference in cream, for this reason that no two farmers' cream would rise under the same conditions. I believe under the same conditions you will get precisely the same cream, but habits vary very much and the cream varies with them. For instance, a farmer had five or six or eight inches of cream and we churned by a test and paid for the next two weeks on that basis. If found short I deducted, and if there was a surplus I added a little to make the thing uniform. I found that the shortage was too great to make anything out of it. Then I got a cherry tester, but this I found impracticable in many cases. Then next we heard of the oil test. The oil tests consist of small tubes about nine or ten inches long. You put in about five inches of cream. The tubes are all numbered as well as the samples of cream, and by this means the manufacturer is protected and the patron is likewise protected. There can be no possible mistake by which the patron will not receive exactly what his cream is worth. The samples of cream are brought in during the day to be sour next morning and rocked in this little churn until they are churned. They are then taken out and put into a water bath, hot enough to melt the butter in these tubes, when the oil will rise to the top, and the depth of that oil is measured and from that we arrive at the conclusion as to how much the cream would yield per inch. If there is a surplus of butter in the cream you should arrive at a conclusion as to what it is worth and add that percentage, and if there is a shortage deduct the percentage. But to get the proper value, these tests should be made every day, because one day a farmer may have twenty inches of cream testing eighty and the next day he may have only ten inches testing one hundred. For every twenty inches of cream he would have twenty-six pounds of butter, taken on an average, and on the first test he might only be paid for two pounds of butter. The patron should be paid exactly for what his cream yields, because we find the cream supplied by very few farmers to the creameries is exactly alike; but I find where proper care is taken the cream will vary very little from day to day. One of the largest patrons I have sets his milk in a spring, flowing right out of the rock, so far down that it is not influenced by the hot weather of summer. The temperature of his cream is kept the same year in and year out. It has stood regularly at one hundred on a test as to the value of the butter fats from the opening of May till September, showing that under proper conditions the cream will always test the same; but I find that under varying conditions it will vary from time to time.

Then, in regard to testing in the centrifugal creameries, Mr. Sprague, our creamery instructor is a buttermaker and can give some information. A great many patrons have the idea that if they send sour cream they will get a higher test, a higher percentage and a higher yield. It is wrong where the cream is taken out of the water and soured. Those who do it are injuring not only themselves but the creamery. There is a certain amount of whey in the lower cream and the upper cream is richer, and when patrons send it to the factory in this shape it is so sour that the buttermaker cannot get the article he should get. We want the ripening and handling of cream done entirely by the buttermakers.

CREAMERY INSTRUCTOR'S REPORT.

Mr. Mark Sprague was next called upon to present his annual report which is as follows :

Mr. President and Gentlemen : It is gratifying, I assure you, to present this Board with the Instructor's Annual Report. There were thirty-nine creameries under supervision the past season throughout Ontario. The daily average make of these thirty-nine creameries was 14,500 lb. of good A No. 1 butter. Of these 39 creameries, 11 are milk gathering and 26 are cream gathering. I secured 27 members. Tested 1,064 samples of milk, and I take this opportunity of congratulating the creamery proprietors on having such an honest and upright patronage, as there was only one conviction, out of 1,064 samples. It was necessary in a few cases to give warning, and the warning in each case was sufficient.

I will embrace this opportunity, Mr. President, to ask the assistance of this Association to be given the cream gathering creameries, by way of their patrons. There seems to be an idea prevalent that their cream must show a test of 15 or 16 ounces to the inch or there is something wrong, and in order to get this large test the cream is placed in a warm place, and in too many instances is injured if not made unfit for human consumption, especially in the hot days of August and July. Now, these patrons should, and must be educated before the desired high quality can be attained. It is true there are localities in which these troubles are greatly modified.

But if you look into this matter you will find an enterprising creamery proprietor. At the Ayton Creamery there was a marked improvement in the quality of the cream received. On enquiry, I found the proprietor was sending out among his patrons printed dodgers or circulars, on the care of their milk, as to straining, care of cream, etc. The creamery patron must be educated as well as the butter maker. Hoping this Association may never tire of its good work, and not wishing to occupy too much of your valuable time,

I am, yours obediently,

MARK SPRAGUE,
Instructor.

Mr. Sprague explained that although there was only one conviction out of 1,064 patrons he did not mean to say that this was the only man who was found wrong. He further said: Now, I find creameries where there is a marked difference in the cream. In one case I found the proprietor had gone to the trouble of getting out dodgers and have the cream gatherer place one in the hands of each of the patrons, giving directions as to the care of milk and cream and this plan worked well, and in those creameries where this has been done I can show the evidence of the good work, especially in Mr. Wenger's Ayton creamery, and I saw when I was there the best of cream, calculated, in my estimation, to make the best butter in the cream gathering creameries. Mr. Wenger deserves great credit for the enterprise he has shown in this direction, and I say this to stimulate a desire in others to do as Mr. Wenger has done.

Mr. J. WILFORD.—Mr. Sprague has given great praise to the Ayton butter and of course he may have tested it, but I imagine in Crosshill we made as good butter as was made in Ayton, and I think we demanded as good a price as any place in Canada and we got it.

AFTERNOON SESSION—QUESTION BOX.

On resuming at two o'clock, written questions, which had been put in the question box during recess, were disposed of as follows:

QUESTION.—How did the dairy butter compare with creamery at the last Industrial Exhibition, Toronto?

The PRESIDENT.—I was a judge at the Industrial Exhibition on butter and I never was so thoroughly struck with the importance of our creamery business as I was at Toronto examining this butter. The finest exhibit of creamery butter, I may state, that was ever made in the Dominion was made in Toronto last September—put up in the finest way. Really it was a great credit to the Creamery Association. You know the Association gave something towards inducing the Industrial Association to give a prize worthy of the Creamery Association and the dairy interest of the country and the exhibit was very nice indeed. The dairy butter, on the other hand, was fairly good butter, but there must have been at the least calculation six cents a pound difference in the value of the average creamery butter as compared with the average dairy butter. So I feel very proud, and hope we will be able to make the difference still wider between dairy and creamery butter. Of course the idea has been talked about considerably of educating our farmers to make better butter at home. If it is to be made on the farm I would like to

make the best we can, but there is five per cent. of the very best farm houses lose money on account of unskilled people trying to manufacture butter without proper facilities and without proper accommodation to manage this particular business. Now, we know that the farmer will get a self-binder and all the other conveniences for himself, while he will have an unsuitable milk room and churn for his wife, who is without ample conveniences and often without skill. So we find out by these things and careful inspection that there is five per cent. or $1,500,000 a year lost through not having proper butter. If we put it at the modest difference of four cents a pound between them, it would make $2,700,000 lost this last year in consequence of not having all the butter we make made in the best way by the best men and with the best facilities.

QUESTION.—(1) Will salting cows regularly improve the keeping qualities of butter? (2) Should the milk be aired before setting for cream? (3) Will salting improve the keeping quality of butter?

Prof. ROBERTSON.—(1) Yes, increase the milk and improve the quality of the butter. (2) I would just air very slightly to prevent the milk from being cooled down. (3) Up to a certain point it will. About one ounce up to a pound is the proper proportion for packed or tub butter.

QUESTION.—What is the best grain ration for improving the color and quality of butter.

Prof. ROBERTSON.—A grain ration should be given with economy. In Ontario two-and-a-half pounds of pease, two-and-a-half pounds of barley and two pounds of bran with one pound of either oil cake or cotton seed meal per cow per day.

QUESTION.—Will you please say which breed of cows are most profitable for butter making and also how much salt we should give per pound?

The PRESIDENT.—Governor Hoard was asked that question by a persistent inquirer and he answered, "My dear friend, you may as well ask me to tell every man in this room what kind of a wife he should keep."

Prof. ROBERTSON—I may tell you that I would rather pick the man's cow than his wife anyway. But if a man wants a large yield of cream or butter he will get the most profitable returns from Jerseys or Guernseys, or their grades. If he has a light farm and wants to get good average milk he will get it from the Ayrshires; but if he wants butter for the winter, and to raise calves for beef as well as milk, he will do best by the Shorthorns of milking strains, and Holsteins.

QUESTION—What is the reason that cream will rise on sweet milk after the cream is taken out of the cans?

Prof. ROBERTSON—Well, when the milk is put into a can the largest of the fat globules rise quickest and come first to the top. If put into cold water as soon after the milk leaves the cow as possible, nearly all the cream will come up. About ten per cent. of it may be left in the milk. If that skimmed milk is set in a can small fat globules may come to the top for two, three, four or five days, but all the cream that comes up after the first skimming is made up of smaller globules. It does not make such good butter. The globules vary in size from the fifteen hundredth down to the seven thousandth part of an inch perhaps.

QUESTION—Would you advise farmers to add water, and if so at what temperature, to milk in the fall and particularly to the milk of stripper cows, to overcome the viscosity of the milk, for the purpose of raising all the cream.

Prof. ROBERTSON—These fat globules of which I spoke have some difficulty in passing through the serum. In the autumn and winter that is more gummy and sticky and will hinder their movement. Therefore, in the fall of the year I would add about 25 per cent. of water to the milk of strippers. I would raise the temperature of the milk to about ninety-eight degrees and it will make the cream rather easier of churning.

QUESTION—Can turnips be fed to cows so as not to be discerned by tasting in the milk or butter? If so in what manner can they be fed?

Prof. Robertson.—Well, the feeding of turnips to cows will always affect the flavor of the fat in the milk. Some people may not discern the flavor but it is still there. But if people must feed turnips to cows the best way is to feed immediately after milking, so that by breathing they will eliminate this odor to a certain extent, and then if they will add a small portion of saltpetre to the milk when it is set it will lessen the effect of feeding turnips. It will still be discernible, but this will lessen it as far as possible.

Question.—Do you say that your experience is that by churning sweet cream, say at a temperature of fifty-five degrees you get more butter out of it than by churning it at sixty degrees? I have found by taking cold, sweet cream and by heating it up rapidly and churning it only about two-thirds of the butter comes off. Can you explain why it is so?

Prof. Robertson.—In the first place I did not say so, but two or three in the hall said so. But even if you heat up such cream rapidly to seventy degrees you will get just the large globules to stick where they strike and the small ones go with the buttermilk. An analysis would shew about one-fifth of these globules remaining in it. But on the whole if you will cause the cream to be a little sour before churning you will get more butter and that of a rather finer flavor.

Question.—If I understood Mr. Wenger rightly this morning he said that he placed test in warm water to start the ripening process. Now, the half of those tests were ripe when he got them and by placing them in the way stated there would be a part of them over-ripe, and as I understood some of our speakers, the over-ripe gave the most butter. Now, what I want to know is how to come at the test in the best possible way to give each patron his right.

Mr. Wenger.—As those who are familiar with the oil test understand, we use from twenty-five to forty tubes in the crate. Some of those put in first at six o'clock will be sour; some put in in the afternoon will still be sweet. It would be impossible to delay testing those that are sour for the sake of ripening those that are sweet. We put those that are sweet into water at probably sixty to sixty-five degrees, so that they will be sour the next morning. The difficulty is we are not getting the butter itself; we are simply getting the oil to measure, and we must have all these tests sour. Now it makes very little difference as long as they are sour and will churn. After being churned the tubes are put into water at 140 degrees temperature so that the butter will melt and rise to the top through the butter-milk. If properly done there will be two distinct parts. The upper part oil, the centre almost pure water, and the lower part casein or curdy matter. If we do not get that clean separation at the first which we desire we put the whole curd right back into the churn and do it over again, until we think it is time to treat it with the hot water bath, so that the second churning will give us a clean separation. The moment we have a clean separation all the oil will lie on the top.

Question.—Are we likely to over-work or under-work our butter?

Prof. Robertson.—In packing butter in tubs the danger is that people will over-work it, but in putting butter into prints, if the butter be kept cool enough, there is little danger of over-working it.

SKILL AS AN ESSENTIAL TO SUCCESS.

Hon. John Dryden, Minister of Agriculture, having been welcomed in fitting terms by the Mayor on behalf of the town, and the President on behalf of the Association, said: I am sure I am very grateful for the kind words that have been spoken by both the gentlemen who have given me this formal welcome in your midst. I am very glad, indeed, to mingle with the citizens of this town and vicinity and to be present at this convention, because I am not merely mingling with the dairymen in this neighborhood, but I find men who are old friends from different sections of the country. We have them from the east and from the west, all interested in the work of the Association. I

ealise that the name which you bear indicates to my mind that you are desirous to improve. Association means associated effort; it means co-operation; and I cannot impress this thought too strongly upon the minds of our farmers everywhere. It is too true that they are compelled to lead isolated lives, and if there is any class that needs to be associated in co-operation it is the farmers of this country, and yet they too often stand aloof when called upon to "stand and deliver" by other organisations which are formed for the purpose of endeavoring to foster one industry and another. Now, we are all working for the good of the common people. We are producing the same products and sending them to the same markets, and when we think of this we must all feel in this regard that by association we are helping one another. By associated efforts you will be able to economise the cost of production of the different products you are bringing to the market.

But I believe, notwithstanding all you may do by the help of this Association in the way of establishing creameries in this country, it will be true for a long time to come that a large proportion of the butter will after all be produced in private dairies. Now, what I feel is that we need to devise some scheme by which we can reach these people, because their products go on the market and mingle with yours and affect the sale of yours to a certain extent. I have been thinking this over, and I want you to assist me in devising some plan which will raise the quality of the average butter in this country. I think I have a right to ask you to help me, and I promise you I will have no difficulty in inducing the Government to assist in this matter when a proper plan can be proposed.

Now, if you are to produce a better article you are to use better skill. Professor Robertson has talked to you about the necessity for the employment of skill in the production of articles which we agriculturists are placing upon the market. Now, I submit that skill is based upon knowledge. Suppose some of you in the summer time should fancy to take a trip down the St. Lawrence and you took your place upon the deck of the vessel; I apprehend you would not go very far without feeling some alarm. Why? Because you see an obstacle ahead which the ship is bound to strike and wreck the vessel and cause the loss of a great many lives; and the cold chills run down your back; you forget just for a moment that there is a man at the helm who has a perfect knowledge of all the obstacles, so that when the proper time comes, by means of the wheel, he is able to guide the vessel so that she turns past the obstacle safely and bye and-bye draws up to the wharf. It was the skill of the man that saved the vessel from disaster, but that skill was based upon knowledge, and he could not have done it if his skill had not been based upon knowledge. And so your skill must be based upon knowledge as well. You must know what you are seeking to do—you must know what you have to do—in order to bring about the very best results, and therefore it comes to pass that although associations like this cannot directly, they can indirectly, help you in this matter. Knowledge itself is not skill. There is a decided difference. We may give testimony of the knowledge we possess, but if the parties interested do not lay hold of that knowledge they will never be able to use it in this skill of which we speak. We as agriculturists need more study, more thought; we need, so to speak, more originality. I like to see a neighbor copying his neighbor, but I do not like to see our agriculturists mere copyists; and some of these gentlemen here have got that originality and are studying these questions out for themselves. We have got to do this throughout the province, and if we are to keep up with the rest of creation we have to move forward in this regard. It is not enough that we should merely exercise our muscles, but we must exercise these muscles more intelligently than we have ever done in the past. Now, Governor Hoard was down at Brockville attending the Eastern Dairymen's convention the other day, and I had a little conversation with him privately, and he was telling me what might be done by the use of skill. He said: "I apprehend you will have to be skilful in breeding, in feeding and in milking. You will have to use skill in all these three matters." He told me of a neighbor who was a patron of his creamery; this man was able to receive something like $38 per cow and he was not satisfied with it and came to Governor Hoard and said: "What am I to do; is there any way I can improve this matter?" "Yes," Mr. Hoard said, "you may improve your herd of cows. Instead

of having the herd of cows you have, you ought to add fifty per cent. to its earning power. Since then the man has gone forward, by using skill and breeding, until last year his herd of cows netted him $63 instead of $38 per head. Now, many of us are ready to say "Oh, I cannot do that." I don't like to hear a young man say that. I never say it. I say if any man can do it I can do it, and if they can do these things you and I can do them; but we don't want to stick at what they have done; we want to go ahead of what they have done. There is no use looking to governments to pass legislation to help us out of the ditch. One of the great cattle firms of Chicago, Armour & Company, are able, by working the grease taken from animals, which might be sold for five cents a pound, through their meats, to obtain eleven cents a pound for it. This is done by the use of skill. It is so with reference to all the products which we grow upon the farm, and what I have to say to you to-day is what I said to the convention at Brockville, that we need to put upon the market a better quality of butter. How much of the imported butter is consumed by the people of Great Britian? They import 20,000,000 hundredweights, but only 22,775 hundredweight of that is sent from Canada. We allow the people in Denmark to get ahead of us in this respect. We must not allow this; we must educate our people, and ask them to come forward with more skill and take a share of the market which is here open to us. I just happened to pick up a report the other day which was sent in to our Bureau of Industries, which came from Robert Reesor, of the township of Markham, giving some interesting statistics. Last year he had thirty Jersey cows. He sold the cream, which he was able to obtain from this herd of cows, in Toronto. He has shown skill, mind you, in the breeding of his herd, although I presume he has also shewn skill in the feeding, and he has shewn some skill in disposing of the product, selling it to large establishments in Toronto like the Rossin house, the Queen's hotel, and McConkey's restaurant. He has produced 3,558 gallons of cream for the year, which he has been able to sell at one dollar per gallon. I have figured this out as being a little over $118 per cow. I don't vouch for the accuracy of this, but give it simply as an example of the skill which has been referred to.

I quite recognise that I am to be followed by some other gentlemen who will talk to you on more practical topics. But I just want to say this to you that we the agriculturists of this country, should seek to help ourselves. One author says, "If you would reform our country you must learn first of all the way." I don't think we have reason to be ashamed of the results in the days gone by; but I am not satisfied, I want to go ahead of what has been done in the past. I want that "Excelsior" should be the motto. You have my entire sympathy, and any reasonable assistance which I can give in the direction of raising the average products of butter you may always count upon. (Applause.)

MILK TESTS.

H. H. Dean, professor of dairying at the Ontario Agricultural College, was next introduced and said: I do not know why I am asked to come here, but I presume it is because I am expected to say something in regard to dairying at the Agricultural College. I have not prepared anything especially to say here, so you will bear with me if my remarks are not as connected as they might be. Then I have been away at institute work, speaking two and three times a day.

Allow me, Mr. President, first to congratulate you upon your election as president. It has ben said, if you want anything to succeed get a big man at the head of it, and I am sure this convention has succeeded in doing this. But not only are you big in stature but also big in brain and in heart, ready to sympathise and help. We are here, gentlemen, in the midst of the land of sauerkraut, limberger cheese and bologna sausages, and I think that if you would keep the President here for a few days he would grow even larger than he is at the present time.

I am somewhat like an Irishman named Paddy O'Brien, who had a Dutch mother. Someone asked if he was an Irishman, and he replied, "Yes I am, be gobs, by Dutch consint." So I am a Canadian by Dutch consent and hence have a warm feeling for my German cousins who have entertained us so well.

I am requested to say a few words this afternoon about milk tests. You know it is the fashion at the present time to invent new tests for the determination of the fat of milk. The chief ones now on the market are Patrick's, Cochrane's, Short's, the Beimling and Babcock. Those are favored on account of the shortness of time they require, but some of these take too long. A test to be serviceable must be accurate. If it comes within two tents of one per cent. it is accurate enough for practical work. Then it must be rapid. Creamery men have not the time to devote a day or two to the testing of milk. Then again it must be cheap; farmers and makers cannot afford to pay a large amount to get the milk tested. And it must also be simple. There are therefore four things necessary in a milk test—accuracy, rapidity, simplicity and cheapness. Now the two chief tests before the public at present are what are known as the Beimling, which is being put out by the Vermont experimental station and the Babcock by the Wisconsin. In the Beimling you use no hot water, but two chemicals instead of one as in the Babcock. The first chemical is made by mixing amyl alcohol and concentrated hydro-chloric acid. The second one is commercial sulphuric acid. By this method you can test a number of samples at the same time. The Babcock uses commercial sulphuric acid and hot water. I have had some experience with the Babcock tester this last season, and I may say that it is accurate enough for all practical purposes. Now about its rapidity. After the milk has been measured, sixty tests may be made in less than two hours. You can get a small machine, but I would advise not to get a machine with an odd number of bottles, one which has fifteen is unhandy as you require to test in duplicate so that you need an even number. Supposing you were going to test eight or ten or fourteen samples it destroys the equilibrium of the machine and it is necessary to fill it up every time. The principle upon which this machine works is as follows: You measure the milk into the bottles, add a certain quantity of sulphuric acid, set them in the machine and by means of a crank it is whirled around at a great speed, add hot water after turning five or six minutes and the fat rises to the top where the per cent. of fat may be read on the graduated neck. Milk is composed of water 87.00 per cent., fat 3.75 per cent., casein 3.90 per cent., albumen 0.75 per cent., sugar 4 per cent., ash 0.70 per cent. Now this sulphuric acid dissolves the casein and albumen and liberates the fat, and the fat rises to the top and in six or seven minutes you can tell the percentage of fat in a sample of milk, so that you have a very rapid means of reaching a conclusion. I think it would be better if milk were bought and sold on the basis of the fat value. The cheese-factory inspector, Mr. Harris I think it was, found one man's milk last summer which contained two and a half per cent. of fat, while the milk of another contained five per cent. of fat. The man whose milk contained five per cent. of fat got no more for it than the other, but was it not worth more per pound than the other? Well, supposing the one containing two and a half per cent. and the one containing five per cent. were mixed together it would bring the average of the fat up to three and three quarters per cent., and from this you can get a cheese of good, creamy quality, so that before long I think we shall use some test like this to determine the fat of milk sent to cheese factories and pay accordingly. In a word I have given you an outline of the machines. Commercial sulphuric acid will cost about two cents a pound in large quantities and one test will cost about one fifth of a cent.

Butter-making.—I have been asked to say a word in regard to butter-making. All the buttermaker wants is the fat out of the milk. How shall he get the fat out of the milk and into the butter? Butter is composed of fat 86 per cent., salt 3 per cent., water 11 per cent. How shall we produce this article and get it in the best shape possible? Just a word in regard to breeding and feeding stock. For the average farmer it will be better for him to select his best native cows—those he knows give a large quantity containing a good per cent. of solids—breed them to a pure bred bull of one of the milking breeds—not one of the beefing breeds—raise the heifer calves on food that is not fat-producing, breed them again to their sire and have them drop their calves

at from two and a half to three years old; milk them for eight or ten months, and after having dropped their second calf all those that do not come up to a certain standard of excellence, say 6,000 pounds of milk in a year containing at least 750 lb. of solids, weed out, as is the practice in the dairy herd at the Cornell Experiment Station. In this way a profitable herd may be built up at much less expense than by buying pure bred cows and paying fancy prices for them, as in many cases when a farmer invests in fancy stock he loses money. It is far cheaper to improve through the male as he is half the herd.

By means of care, research and patient enquiry the Germans found that if a certain ratio of elements were fed the best results would be obtained in milk production. They say if you have a cow weighing 1,000 lb. she requires, dry matter 24.0 lb., albuminoids 2.5 lb., carbo-hydrates 12.5 lb., fat 0.4 lb. Such a ration will have a nutritive ratio of 1.54. By nutritive ratio we mean the ratio or proportion of nitrogenous or muscle-forming substances to the carbonaceous or heat and fat-producing substances. Now, I do not think that a farmer is wise to follow too closely along that line but simply use it as a guide. Some farmers say of theory that it does not amount to anything. But is there not something in it? To illustrate, I have here a couple of rations fed by New York dairymen. One was feeding the following daily to each of his cows. Hay 12 lb., corn stalks 13 lb., straw 8 lb. Nutritive ratio 1.156, or he had nearly three times as much heat and fat-producing foods as required by the German standard. Such a ration would cost about ten cents a day, and for a year $36.50. He had a herd of eight cows. How much butter do you suppose he was getting from his cows? He was getting 156 lb. a year from each, which if sold at 25 cts. a pound would bring him $39, and he would make on each cow $2.50, and on his herd of eight cows $20, that is supposing the manure and skim-milk paid for the taking care of the cows and the milk.

Here was another man in the same state that was feeding each of his herd, hay 20 lb., ensilage 50 lb., corn meal 3 lb., bran 7 lb., cotton seed meal 3 lb., nutritive ratio 1.67 which comes nearly to the German standard. This man was getting 470 lb. of butter from each of his herd while the other man was only getting 156 lb. 470 lb. at 30 cents a pound would bring him $141 for each cow for a year. I have supposed that he received 30 cents a pound for his butter because a man who puts skill in breeding and feeding will also likely put skill in his marketing, for scientific making is the hand-maid of scientific marketing. Well such a ration as that would cost for each cow about 30 cents a day and for one year $109.50, and he would make on each cow $31.50, or from the whole herd of 30 cows $945. So after all it appears that there is something in science and I think that when we have such examples as that, we can no longer say there is nothing in science as applied to the dairy. I have just selected these because they are extreme examples. Well, if you have got a good cow how shall the milk be profitably turned into butter? What I have to say is more particularly for farmers. Prof. Robertson this morning dwelt on the necessity of properly setting the milk, and I would emphasise keeping it as clear as possible because milk is extremely susceptible to impure odors. Therefore see that there is no impure odor while milking. During the process of milking you promote the secretion of milk because it has been found on killing cows that there were only one or two quarts of milk in a full udder and from that scientists have concluded that during the process of milking the milk is secreted and milking induces the secretion of milk. In regard to the best way of setting milk have a special room for it and do not set in a closet or cupboard in the living room where impurities will reach it. You cannot make a first-class quality of butter if you set it in such a place. I am glad to emphasise what Prof. Robertson said about having a special place. I agree with him that it is not wise to set milk in a damp cellar. If you can get a dry cellar I think it could be used for milk and where there are furnaces in the cellars it will require no extra heat; but where you cannot have that, have separate milk houses. In regard to shallow pans, if you have the milk in them under the very best conditions you will get as good results as from the deep setting, but there is a greater amount of labor and it is more difficult to control the conditions. In the case of any person who has a proper place, it is a good idea to set the cans outdoors where there are no foul odors and no danger of the cans being knocked over, but do not set them in a living room because

you will not get all the cream. If you are to get the best results you must have a falling temperature because the cream is of a less specific gravity or lighter than the other constituents and rises best with the temperature falling. In regard to the time to leave the milk set, you will get all the cream to rise that is worth getting by the deep setting system in twelve or twenty four hours and in the shallow pan in 36 hours, Mix the cream from all the skimmings at least twelve hours before churning, because in this way you get the cream all to the same degree of ripeness. I carried on some experiments this winter in which an Ayrshire cow's cream was churned while sweet, and the butter-milk contained 5.4 per cent. fat in it. . Ordinarily it only contained one per cent. A Holstein cow's cream churned sweet, the buttermilk had 4.5 per cent., ordinarily it contained 0.25 per cent. of fat. And a Jersey cow's cream which was also churned sweet contained 0.2 per cent. of fat while ordinarily it contained 0.30 per cent. of fat. This one experiment indicated that a Jersey cow's cream gave best results when churned sweet, while the others were not nearly so good, but it needs to be verified. Do not add hot water to the cream. I have seen women do that. It will spoil the grain and color of the butter. A better plan is to set the cream, crock or pail in a vessel of water heated to not over one hundred degrees. If you warm quickly it will spoil the cream. Between fifty-eight and sixty-four degrees will give the best results. When I was a boy I had to churn until the dasher would stand on top of the butter. Well, now that is a very poor plan because by that means you get too much curdy matter in the butter in which there are elements that tend to make the butter taint. Stop the churn when the butter is in the granular state. Take a little salt water after draining off the buttermilk and wash the butter which will wash out most of the casein or curdy matter. In salting butter between half an ounce and an ounce of salt to the pound will give you good results. There has been quite a controversy during the last season with regard to the yield of butter from the different breeds, some giving the results as salted and others as unsalted butter, the former way is the better. It has been said that butter will not weigh as much after being salted as before. I tried some experiments lately, and as an average of fourteen experiments, the average weight of which was fourteen pounds six and a half ounces, the loss was two pounds eleven ounces. The greatest loss was five pounds five and a half ounces in sixteen pounds five and a half ounces, and the least loss was thirteen and a half ounces in eleven pounds. In every case the butter was drained as dry as possible in the churn, weighed and salted at the rate of one ounce to the pound, and then worked ready for market. Thus you see butter loses in weight after salting, as salt absorbs the moisture. I think it is better to work it by pressure than by friction, and by all means do not work the butter with your hands, because all the time there is coming from our bodies effete or foul matter through the skin and lungs. Suppose you have washed your hands ever so clean you cannot stop this coming off and going into the butter. In olden times people used to try and get a dairy maid with cold hands, possibly for the reason that a "cold hand indicates a warm heart," but more likely because they thought such a person would not be so likely to taint the milk or butter by handling. It will not be necessary to work it more than once if sold near home, and there is just as much butter spoiled by overworking as by underworking. In marketing put it up in a neat and attractive form. I think these packages which we see here to-day are a great advance on the old plan of putting butter on the market. I have heard of an instance where a man put his butter in a piece of an old shirt on which some of the buttons were still to be seen. A man who puts it up in that style cannot expect to get the best price. If you produce a first-class article there is always room at the top, but so long as persons make good, bad and indifferent butter, we cannot expect good prices. We have made a reputation in cheesemaking by co-operation, and if we are going to get a good reputation for our butter it must be done through co-operation. I do not see anything to prevent farmers co operating and getting their cream made up on a general plan where they are assured of a uniform article and uniform price. The greatest drawback at the present time is not because there is not good butter made at home, but because some of it is good and some of it is bad. What the export trade requires is a uniform article, and to get this it will be necessary to make it on the co-

operative plan. I am glad the Association is educating our farmers because we cannot know too much, and the more knowledge we can have regarding the art of buttermaking or of anything at which we are engaged, the more likely we are to succeed.

AN EXPLANATION.

Mr. WENGER.—I wish to say a few words to place the inspector right before you. Just before dinner there was a reply which I thought reflected both on Mr. Sprague and myself. Mr. Sprague called at my place several times last summer. I have spent in the last six or seven years thirty or forty dollars a year in putting my views before my patrons. I have attended every convention we have had; I have swallowed everything that has been said; I have read Hoard's Dairyman; I have the reports of these conventions, and from all these things I have formed certain conclusions. I put these down concisely in English and German and distributed them among my patrons. I called Mr. Sprague's attention to this and told him that the patrons had brought uniform cream during the season. This of course was in Mr. Sprague's mind, and that is the way my name was brought up. In regard to the gentleman who said he got a better price than me, that is a matter between him and his buyer.

Mr. SPRAGUE.—I can assure you that I was put under peculiar circumstances through reading the report. I wish now to make an explanation, not to retract anything I have said, but to try to make you understand the report in the way I put it. I said this, that the quality of cream that I saw this summer at Mr. Wenger's creamery enabled him to make the very best quality of butter.

THE CATTLE EXPORT TRADE.

Moved by D. Derbyshire, seconded by A. Wenger, and resolved

That whereas the trade in the export of live cattle from the Dominion of Canada has been gradually extending during the past few years and has been a source of profitable income to our farmers and carrying companies, we, the Creamery Association of Ontario, hereby record our judgment that the robust health of the cattle of Canada, their freedom from all dangerous diseases and their general excellence of quality is proverbial, and that the people of England need not fear that the health of their stock will be injured by the arrival of our cattle on their shores. We regret very much that the weather has of late been so inclement on the sea that some of our cattle have perished. That does not establish the presence of any disease in Canada, and we hope that Mr. Plimsoll will remain in Canada long enough to be convinced of this fact. It will be a very serious matter if the landing of live stock be stopped in England, as we cannot compete with the ranches in the west where they can raise cheap corn for the breeding of cattle.

A WINTER EXHIBITION OF BUTTER.

Prof. ROBERTSON: Just a few words. I examined a print of butter brought here this forenoon. It was of excellent quality. That leads me to say that I think next year the Ontario Creameries' Association should have an exhibition of butter in connection with the annual convention, and then the good qualities could be pointed out and the defects made evident. Sometimes during the summer exhibitions the weather is warm and the outside of the butter is therefore soft while the inside is good in body and flavor. At this season there would be no difficulty of that kind. Part of the money of this Association now unexpended could be used in the way I suggest. Instead of giving so much in the way of prizes at the summer exhibitions we might save the money for the winter, and have prizes large enough to attract exhibitors from all parts of the province.

I listened with a good deal of pleasure to Professor Dean, of the Ontario Agricultural College. I have a great many children over this province in some senses, and as I followed his line of treating his subject this morning I became convinced that I had a worthy pupil who would bring credit to the institution which he represents. If every farmer will give him a fair chance to do good work amongst you I am sure that you

will not be disappointed. With a little longer experience in public speaking he will be able to hold his own before any audience. My own first attempt at a public address was a pitiable exhibition of weakness compared with the capital presentation Mr. Dean made of his subject to-day.

DAIRY EDUCATION FOR THE FARMERS.

Mr. MACFARLANE: I merely wish to express my gratification at the sentiments and assurances conveyed in the speeches of the Minister of Agriculture and Professor Dean and also to say that it occurred to me that perhaps in the whole of the discussions which have taken place during these two days the farmer had not had the best "show." He was somewhat in the position of the congregation as against the clergyman; they are not allowed to jaw back. It is allowed too that since co-operation is supposed to be the best plan it is not very judicious to encourage the matter of private dairying. It seems to me if you encourage the farmer to do that thing you are bound at the same time to help him in this way. If for instance a certain individual undertakes to make a better quality of butter than his or her neighbors, and succeeds in so doing, and carries this product to the storekeeper and finds that there he or she can get no better price for it than for the most inferior quality that is offered to the said storekeeper, I think there is very little encouragement, indeed, for the farmer to proceed and do the best he can. It is not realisable in dollars and cents. His butter is made a good deal better and yet he obtains no better price for it. Now, I think something ought to be done to help the farmer in that way, and I do not see any other way that this can be done than by encouraging a co-operative system, and anything that may be done to help the farmers in this respect would be trying to establish in a good dairy district a model butter factory for the purpose of taking the manufacture entirely out of the hands of the farmers and doing it in the factory. Now, there is a difference in the values of cream, as Professor Dean has shown you. He spoke of milk being delivered to cheese factories, some of it considerably more valuable than others. In this case, too, the dairyman or farmer who delivers a five per cent. milk has no advantage in doing so. He is simply paid at the same rate as the man who has a two and a half per cent. milk, which is no encouragement to breed dairy stock. If he is to be encouraged at all it must be by giving those who produce a better quality of milk a better price. In order to do that the system of paying according to the fat in the milk must be introduced; and here it is that the Governments might do some good by establishing a creamery in some favorable district, worked upon that principle, getting the results and showing to other districts what could be done. I hope any assistance which the Governments may give will take that shape.

Mr. J. WILFORD.—I do not know Mr. Macfarlane, but I cannot afford to let what he says pass without making a few remarks. In 1886 we established a creamery at Crosshill, and what brought the matter to my mind was that Mr. Macfarlane says the farmers and farmers' wives should be helped to work in their own system. Some ten or twelve of us took out stock in this creamery. We have placed in stock at the rate of $1,600, and from 1886 we have not received the first cent benefit for our money. The farmers in that section have received the value. We propose holding our annual meeting on the 24th of the present month, and there is no dividend for us still; but we don't care a straw if we don't get a cent benefit from the money advanced if we only get farmers to send cream to the creamery to be manufactured into butter. There is one merchant up there who takes dairy butter from the farmers who trade with him, and I understand from himself he has lost between five hundred or six hundred and a thousand dollars on that stuff. He does not get a cent benefit from it.

Mr. WENGER.—We do not blame the farmers; it is the merchants. If a woman comes in and brings forty pounds of butter and buys $500 worth of goods in a year and if I can secure her trade by giving her four or five dollars more for her butter than it is worth I am going to do it and the rest of the merchants do the same. At Ayton we give cash for the cream, and then it is the same as when wheat is taken to the mill—it is examined and bought for what it is worth. (Applause.)

INCREASED GOVERNMENTAL ASSISTANCE ASKED.

Moved by JOHN HANNAH, seconded by J. S. PEARCE, and resolved, that—

Whereas the ever-growing magnitude of our dairy business is creating new problems and difficulties in he production of milk and the manufacture of cheese and butter, which dairymen in their private business endeavor are themselves unable to solve and overcome, and whereas the Provincial Government in the past has given liberal assistance to the dairymen for the purpose of assisting in the dissemination of valuable information, and the giving of instruction through itinerant inspectors to both the producers of milk and the manufacturers, and

Whereas the Dominion Government has established the office of Dairy Commissioner for the Dominion charged with the duties of carrying on investigation into economical methods in the obtaining of the finest quality of dairy goods, and whereas this Association in convention assembled heartily recommends to the farmers of the province the advisability of developing the practice of winter dairying, whereby they might add to their profits from cheese-making in summer the enlarged profits from butter-making in the winter, the Creameries Association of Ontario respectfully requests the Ontario Government to continue its financial assistance to this Association upon an increased scale so that the work of the Association might be prosecuted with enlarged vigor and success.

Resolved further that this Association urge upon the Dominion Government, the advantage and need for the extension of the work of the dairy commissioner by the establishment of branch dairy Experiment Stations under the direct supervision of Prof. Robertson for the purpose of carrying on such investigations into the principles and practices of improved butter-making during the winter by fitting up these stations for that purpose, and by the making of trial shipments of fresh-made butter in suitable packages to foreign markets in order to gain reputation there and to create a demand at the highest prices by demonstrating the excellence of its quality.

Resolved further that copies of this resolution be forwarded to the Hon. the Minister of Agriculture for the Dominion and the Hon. the Minister of Agriculture for Ontario for their favorable consideration

Mr. JOHN HANNAH.—I would just say in connection with this, that although engaged in the creamery business altogether, I would feel that the cheese factories should pay attention to butter-making in the winter for this reason, that I notice immediately upon the close of the cheese factories the butter drops in local markets, particularly those that are in the centre of cheese districts. Even with creamery butter, we find that is a disadvantage. Instead of earning money, the farmer's wives are wasting good valuable milk, when not used to making butter, and that hurts our local markets. They come in with this rush of poor butter and the quantity deteriorates the price for our creamery butter. Now, if those cheese factories would turn their attention to making butter, we would get over this difficulty. Being in that line of business, they would find a market for an export trade, and I think that the creameries which are running as creameries alone would be gainers in the end. I am scarcely as hopeless in regard to the likelihood of the whole of the butter made in Canada being made in the creameries as some of the speakers seem about it. The Minister of Agriculture, and I think Professor Robertson, took the view that it would be a long time before half the butter would be made in creameries. As I said before, we should also then have some encouragement to work the whole year round.

The resolution was then carried unanimously.

RESOLUTIONS OF CONDOLENCE.

Moved by AARON WENGER, seconded by JOHN SPRAGUE, and

Resolved.—That whereas by the lamentable death of the late James Miller, who in past years rendered this Association good service in the capacity of director, and added much to the interest of its conventions by his genial presence, we place on record an expression of our sense of deep loss by the removal from our midst of our late co-laborer.

Resolved further, that a copy of this resolution be forwarded to Thomas Miller, Spencerville.

The PRESIDENT.—I thank the Association for this resolution, as for fifteen years Mr. Miller lived within a very few miles of Brockville; was one of the most active of our dairymen; one of the brightest minds we had in this great world; one that made his cows pay $60 a head, and one that built up and did a great deal in his own locality to uphold the hands of the dairymen in every section of Canada.

Moved by JAMES W. ROBERTSON, seconded by JOHN HANNAH, and

Resolved.—That it is with feelings of deep regret we have learned of the sad decease of the late Mr. Weld, the founder, proprietor and editor of the *Farmers' Advocate*, of London, Ont., and whereas we recognise the energy, integrity and fearless advocacy of the rights and interests of farmers throughout the Dominion, which always characterised his public life, we hereby place on record our heartfelt appreciation of the valuable services which our late highly-respected co-worker rendered to the people of Canada, and our sincere sympathy with his bereaved relatives in the irreparable loss which they have sustained by the untimely ending of his life.

Resolved further, that the Secretary forward a copy of this resolution to the office of the *Farmer' Advocate*. Carried unanimously

ADDRESS BY MR. I. E. BOWMAN, M.P.

Mr. I. E. BOWMAN, M. P., was then called to address the convention. He said : I am very glad indeed that you told the audience that I was only to address them for a few moments, because I have not a great deal to say to you at this stage of the convention. My good friend asked me to be present and I suppose he thought it was advisable in order that I should learn something about butter-making, and if so I think he was right, because I do no profess to know very much about it, although I have studied it for five or six years and have reached certain conclusions. I would just congratulate the farmers of the county of Waterloo in being so fortunate as to secure the holding of this convention in the town of Berlin this year, and I suppose you will allow me to thank the Creamery Association on behalf of the farmers of Waterloo for coming here and holding their convention in their midst. I am sure that the farmers present could not fail in learning a few things, and allow me just to say here that I think the manufacture of cheese (and now the manufacture of butter) occupies a very important position in the industries of our country. There is perhaps no other industry in which the farmers are interested so much as in the successful prosecution of the butter and cheese trade. Our cheese has obtained a reputation in England greater than butter, but I am confident that we will see the day when Canadian butter will stand as high as any other butter in the world. (Applause.) I highly approve the sentiments expressed here to-day in endeavoring to impress upon the farmers the great necessity of making the best quality of butter it is possible to produce. Our manufacturers find it important to put their wares up in the best possible style Any manufacturer who does not do that falls behind and does not succeed. It is the same with the farmer. It is not only necessary to make the best butter, but it is necessary to put it in as respectable a form as possible. That has a great deal to do with the sale of it. I am speaking of the practice of farmers in making their own butter at home. It is quite true that where a farmer has a wife and lives near a town such as Berlin or Waterloo she can perhaps get as good a price as is going, but these are isolated cases. This cannot be done by the large majority of farmers throughout the country ; and in order to obtain the best results it is absolutely necessary, as one of the speakers told this convention, that it should be made at the creamery. It is impossible for a farmer's wife to have the same facilities and appliances provided with the same care as a company which runs a creamery on a larger scale. So it is not possible, under very exceptional circumstances, to make as good butter at home as in the creamery. Then another advantage which the creameries possess is that they have a large quantity of butter which is of uniform quality, and for that reason better prices can be obtained in all cases ; that is inevitable. I do not sympathise very much with those unfortunate storekeepers who say they have lost money in buying dairy butter. I fully agree with Mr. Wenger that in Berlin and every town of an equal size the merchants ought to join together and have butter sold on its merits the same as anything else. It is done in the Western States and a drygoods man does not buy butter ; not every groceryman buys butter, but a certain merchant makes it his business to buy all the butter that comes in, and instead of stipulating that the farmer should take it out in trade pays over the money. Well, now, if we could only impress upon the farmers the great loss which they sustain in the difference of price of a first-class article which is sent across the ocean and in some of that which is sold for grease,

I am quite sure that every farmer would fall in with the idea that it is far better to have the butter made at the creamery. I have taken a little interest in the St. Jacobs creamery; I have not taken any stock; I thought the farmers were able to look after that themselves. That creamery has been decidedly successful in turning out a good article of butter, and I have no doubt in future it will compete with Mr. Wenger. Farmers sometimes think it is a little more convenient to make the butter than to take the trouble to sell the cream. I have not had any experience and cannot settle the question, but what I should like to see is that we should produce the best results, as I am anxious to see we should produce the best results in connection with everything that our country is capable of producing. I hope that every farmer will benefit to the greatest possible extent by the discussions that have taken place and that at some future time the Creameries Association, remembering how well they were treated at Berlin, will come back to hold their convention in our midst. (Applause.)

TESTS AND MILK CANS.

Mr. J. Wilford, after repeating what he had said as to there being nothing in the Crosshill creamery for the owners, said: Last year we manufactured 24,379 pounds. The number of inches of cream were 27,670. It took about an inch to an inch-and-an-eighth to make a pound of butter. Our cream cans are based on the Gurd's creaming system; that is they are twelve inches in diameter and twelve inches perpendicular; each inch is supposed to hold 113 cubic inches and each inch is supposed, if it stands the test of one hundred, to make one pound of butter. We commenced to manufacture on the 29th of May and sold that make at a fraction over twenty cents. We sold June, July and August at eighteen cents and September and October at twenty-two cents. Therefore after our allowance of three and a half cents for manufacturing, the patrons had sixteen and a half cents of the twenty cents, eighteen and a half cents of the twenty-two, and fourteen and a half cents of the eighteen, and up to the present time we have not received a fraction of profit, and I was going to ask the Minister if we applied to the Government would they help us poor fellows up in the west. (Laughter.) During the season of 1890 we had eighty-one patrons.

Mr. John Lackner—What is the least amount we may get this test into a creamery for?

Mr. Wenger—We have a Gurd's oil test. With the churn we paid $70. We got in something like forty-two tubes.

Mr. John S. Pearce—These churns vary in price according to the number of bottles which they contain. We have them all the way up to two hundred bottles.

Mr. Lackner—What vessels do you prefer in gathering cream?

Mr. Wilford—The first two years we tried pine tubs and the last two years we have cans and we find they give us good satisfaction.

Mr. Lackner—What kind?

Mr. Wilford—Double cans.

Mr. Lackner—Did you have them lined with tin?

Mr. Wilford—No.

Professor Robertson—The requirements of a can are first, that is should be a non-conductor so as to keep the cream from being warmed up in transit. There are double tin cans and wooden ones lined with tin. They should have a float to keep the cream from churning and another cover to keep the dust out. This will enable you to get your cream to the factory without injury.

Mr. Wenger—I have used a tank with air spaces all around the sides. I open a tap and run the cream out through that into the cream vat. There are two spaces between the tin and the outside. We carry enough cream to make five hundred pounds of butter.

Mr. Herbison said he had introduced a wooden refrigerator can built square. They are made to hold twenty-five or thirty gallons each. They sit nice and compact in the waggon, and I have had them in use for a season and the weather does not effect the cream in any shape. There is a space of about two inches between the inside tin and the wooden case. We paid somewhere about $9 for a thirty gallon can.

Mr. LACKNER—Which cost the cheapest the square tank or the large one?

Mr. WENGER—I paid no attention to that. When I came to the conclusion that I wanted it I got it. We think the tank is preferable. You have nothing to handle. You have no cans to handle and you hear no profanity around because there has been a big spill of cream. You put on the tube, open the tap and let the cream flow out nicely.

THE LOCAL AUTHORITIES THANKED.

Moved by Aaron Wenger, seconded by Mark Sprague, and resolved, that—

Whereas the Mayor of Berlin and its enterprising citizens have entertained our members and guests with kindly hospitality, we hereby express our fraternal good wishes for the prosperity of the town and the many interests represented by its large and thriving manufacturing and mercantile concerns.

Mayor JANSEN replied in appropriate terms.

CLOSING PROCEEDINGS.

At the suggestion of Mr. Isaac Hillborn, Professor Robertson repeated a portion of his remarks of the previous day concerning the silo.

QUESTION.—Would it pay to get a separator for, say, fifteen cows, provided we were raising calves.

Prof. ROBERTSON.—I think it would pay to use a hand separator.

QUESTION.—What is the cost of a separator?

Prof. ROBERTSON.—You can get a hand separator for $125 and up to $375.

President DERBYSHIRE.—Of course our good friend Hunter has a separator but he has a lingering idea that this butter extractor which takes it from the milk at once is better, and that is exactly what we want to do.

A VOICE.—Would you advise crossing Jerseys, Guernseys and Shorthorns.

The PRESIDENT.—I would not do it if it were me, but if asked if I would cross a thoroughbred sire with a breed of grade cows I would say that it will largely influence the quantity of milk given by animals.

Prof. ROBERTSON.—If I were asked this question: "Would I cross thoroughbred Jerseys with thoroughbred Shorthorns?' I would say "No" emphatically; but if I were asked whether I would cross thoroughbred Jerseys with a breed of grade cows to improve the butter quality I would say "Yes" emphatically. The feed will largely influence the quantity of milk given by animals and will control the quality to a small extent. The quality of milk as to its per cent. of solids depends mainly on the breed. Jerseys and Gurnseys give on an average about one-half more butter fat per 100 lb. of milk than ordinary animals.

The PRESIDENT.—The first thing this gentleman ought to do is to come to a conclusion what he is to do for a living. If he is going to be a practical farmer and wants to get rich and then do something for his country he will select something that will suit his purpose. In my address yesterday I advocated the buying of milk for the value that was in it of butter fat. That is, if the milk contain under two-and-a-half per cent. butter fat he would get paid exactly what it is worth, and if five per cent. butter fat he would get paid for what he delivered. I think that is the fair way. I think that is the basis of this buying and handling of milk and that we will some to it. If a patron of the

cheese factory to-day I would get a Holstein cow and put all my energies to getting all the weight of milk I could, and if going into a butter factory I would select one adapted for butter business. If you put into practice some of the very helpful thoughts that have been expressed here, of course our meeting has not been in vain, and we have not failed to accomplish the great desire that we are fostering in our midst, and we have done our duty by the Government that has provided us with funds to do this work. I repeat that we need to change the proportion of our butter made in creameries and in private dairies so that the ninety-seven per cent. will be manufactured in creameries and the three per cent. manufactured in private dairies. Ninety-nine and four-fifths of our cheese made to-day is made in factories. They are getting better factories, better facilities, better selected cows, better ventilation and proper nutritious food. Feed your cows, because your cows cannot do anything without having proper feed, and a cow is worthless of herself. Put your cows in a proper stable, with a little plaster sprinkled on the floors every morning, and have a pure air for your cows to breathe in, and educate all the children to make more and better cheese and butter, and to grow better crops, and in this way build up your houses. Educate your children; give your boys and girls an opportunity of being educated the same as those in other lines of life, so that they can take their place with doctors and lawyers—and feel satisfied with themselves. Have men in parliament that have your interests at heart, men that are in sympathy with your work and will aid you in building up this great country and will do exactly as you desire they shall do. Make agriculturists the head and front of the nation, because upon the prosperity of agriculture the success of all our other industries depend. See to it that you make your position one that will be a power in any country in the world. And I hope you will take advantage of your opportunities. The Agricultural College at Guelph is established for the benefit of your boys. The farmers of every county of this Province are entitled to send one student there free. Get the county council to see that they are sent there. I had my boy sent there. I wanted above all things that he should be an honorable boy, and that, if he was going to be a farmer, he should be educated for it. I sent him to the Agricultural College and I went to that institution and saw Prof. Robertson and the other professors taking hold of him and building him up, and I tell you it is a positive fact that in three years that boy came back an ornament in comparison with what he was before he went there; and I believe every boy in the Province of Ontario who is going to follow farming ought to be sent there. If our young men will avail themselves of the instruction imparted at this institution and as such conventions as the present they will see that we talk exactly what is determined and what we are all aiming at—that we should be a great people—so that we may take the position in other lines which we have taken in our cheese business. They even come from the Old Country to see, and we send our young men over to show them there how to make cheese. We are the first men who sent a travelling teacher from one factory to another. We have a teacher of that kind in connection with this institution. He goes from one creamery to another in order to try to keep up a uniform quality of butter, and you should see that you get the desired instruction. We are determined to take the place that nature designed we should take in this matter. I remember when Brockville butter sold for the highest price of any butter that went to the Old Country, but we found the moment that other countries entered into the creamery business they led right off, and the consequence was that they took the butter trade from us, and we have not got any butter trade at the present time, because we have not been as faithful to our profession as we should have been. I hope after the instructions given at this convention and the intelligent addresses that have been made that every dairyman will go home and stop the leak in the stable floor, in the first place. Do not buy manure from your neighbor; do not buy from the cities artificial manures when all these materials are being wasted in your own stables. Build better stables; get the best cows; have some head for your herd from a stock that have been deep milkers from away back, and then see that the common sense and judgment displayed at these conventions are put into practice. Store up this nutritious corn food for winter and reduce the cost of milk.

This closed the proceedings, and the convention then adjourned.

(No. 37).

Report of the Ontario Agricultural and Experimental Union for the year 1890. Presented to the Legislature 22nd April, 1891. (*Printed as part of the Agricultural College Report.*)

ANNUAL REPORT

OF THE

INSPECTOR OF DIVISION COURTS

FOR THE

PROVINCE OF ONTARIO

FOR THE YEAR

1890.

PRINTED BY ORDER OF THE LEGISLATIVE ASSEMBLY.

TORONTO:
PRINTED BY WARWICK & SONS, 68 AND 70 FRONT STREET WEST.
1891.

ANNUAL REPORT

OF THE

INSPECTOR OF DIVISION COURTS

FOR THE

PROVINCE OF ONTARIO

FOR THE YEAR 1890.

Office of the Inspector of Division Courts,
Toronto, 31st December, 1890.

To His Honour
Sir Alexander Campbell, *K.C.M.G.*,
Lieutenant-Governor of the Province of Ontario.

May it please Your Honour:

I have the honour to submit the following report upon the Division Courts of the Province for the year 1890.

The tables will be found to contain a large amount of properly classified information on the subject.

Number of Suits—Amount of Claims.

From Table A, it will be seen that there were entered 62,367 suits, for claims amounting to a total sum of $2,535,165. This is exclusive of transcripts of judgments and judgment summonses.

Received and Paid.

The total of suitors' moneys paid into court amounted to $827,531.87, and the total paid out to $813,673.33. Adding balances brought forward from previous year, there remained a total, at the close of the year, of $23,956 in court to the credit of suitors.

Revenue.

The percentage on fees and emoluments of clerks paid into the Provincial Treasury amounted to $9,097.88, being an increase of $469.67 on the amount of the previous year. After deducting salaries and contingencies, $4,550, the net surplus revenue amounts to the sum of $4,547.88.

Complaints—Investigations.

Complaints against clerks numbered 184, and against bailiffs 175, during the year—all of which were duly enquired into and investigated. The bulk of the complaints continue to be of the same character as mentioned in former reports, viz. : neglect in making returns ; withholding suitors' money, and not notifying parties when moneys paid into court ; neglect in answering letters of suitors asking for information ; irregular collections ; officers of the court acting in collusion with defendants, in order to defeat process of the court ; overcharging ; wrongful taxation ; infringement of the rules, and of the tariff of fees.

Prompt enquiry followed on every complaint, and the correspondence on file contains numerous letters of thanks from suitors and their attorneys with expressions of satisfaction at the result.

Appointments—Resignations, etc.

There were 26 new appointments of clerks and 18 appointments of bailiffs during the year, to fill the same number of vacancies caused by resignations, deaths and forfeitures of office, besides the appointments of officers to two new courts.

Covenants.

Particulars of covenants were received, and certificates of the filing of covenants examined, in 104 cases of clerks and 66 cases of bailiffs, in which new sureties were given or changes made, necessitated through death, insolvency, etc.

Leaves of Absence—Deputies.

Papers granting leave of absence for various short periods were made out and transmitted to 62 clerks and 54 bailiffs, and for the appointment of their deputies to act for them during their absence.

Seals—Courts.

New seals were provided for 15 courts to replace worn out seals, including also seals for the re-arranged divisions of Manitoulin and for two new courts established during the year.

Correspondence.

The voluminous correspondence in reference to the above subjects, and as to the annual returns required to be made by clerks and bailiffs, and miscellaneous questions asking for advice and direction exceeded that of last year, when over 3,000 letters were written, besides the transmitting of circulars, blank forms, etc., from time to time.

INSPECTION.

I was enabled to devote the greater part of my time during the year to the work of outside inspection. My visits extended to courts in all parts of the Province. I am pleased to say that there is a marked improvement observable in the manner in which the books and office papers are now kept by officers of the courts compared with former years, and to bear testimony to the zeal, intelligence and carefulness with which most of them discharge their duties. There are many matters, however, in which there is still much room for improvement.

Complaints continue to be made as to clerks using their office for the purpose of collecting debts, without suit, on percentage. Every clerk must be now aware that this practice is wholly wrong, and that it is expressly prohibited by section 58 of the Division Courts Act for either a clerk or bailiff to collect on commission. Ignorance of the law cannot be pleaded. And I have only to remind those officers who persist in violating the law that, in addition to the gravity of their offence in this respect, it is the opinion of a learned authority that any moneys received by them contrary to the section of the Act mentioned, would be recoverable back by the person who paid it.

A very improper practice which came under my notice is that of clerks writing off in their cash books the moneys standing to the credit of suitors by carrying the entry to ledger account. In no instance is a clerk at liberty to close out entries in this way. There must be clearly shewn upon the proper books of the court the proof that payment has been made and the clerk discharged.

When suitors' moneys have been collected, it is the duty of the clerk to notify the parties entitled thereto, and thereupon it becomes incumbent on the latter to direct how the same may be transmitted to them. The clerk is not bound to transmit by post any such moneys, nor to procure or transmit post office orders therefor, unless upon the request and at the expense of the party entitled to the money. Without such directions and request all moneys are payable to the parties at the office of the clerk, without the payment of any fee whatever. In no case is a clerk to transmit money to the clerk of another court without the written order of the party entitled thereto or his authorized agent.

With reference to the cash-book, it should be borne in mind that it is intended not only to be kept correctly, but also to facilitate the examination and inspection of accounts. In no instance should accounts be extended over three months, and, where the business is large, one month should be the limit, and on every balance there should be a checking and comparing of accounts. The unreceipted moneys should always make the net balance. Neglect of this important duty is the frequent cause of the most disagreeable complications and the foundation of angry, and often unjust suspicions.

Another bad practice, and one that cannot be too strongly condemned, is the neglect of those clerks who do not make prompt or regular periodical settlements, with their bailiffs. In some of these cases the bailiffs take upon themselves to retain collections made by them, returning their executions and asking their clerks to pay the moneys collected out of the fees coming to them. Bailiffs not only act improperly in this, but

are guilty of a direct violation of the rules. On no pretence whatever can this be permitted. It is the duty of the bailiff, indeed the law expressly directs that he shall pay the money made in every case into court when returning the writ, and within six days as provided by rule 96 under penalty of loss of office. Neither is it permitted a bailiff to deduct his own costs in any case from moneys collected. The total sum received by him must be paid into court in every case; after which it is the duty of the clerk to tax and pay the bailiff his proper costs under the tariff out of the moneys received.

The duty of clerks and bailiffs in both these respects has been heretofore unceasingly pointed out by me. Its neglect leads to much trouble and inconvenience, and not infrequently to loss. In future greater strictness in the one case, in the settlement of accounts, and full obedience to the law in the other will be insisted upon.

Carelessness and dilatoriness in the payment of "foreign fees" is another source of complaint, revealed to me and always condemned, in the course of the duties of inspection. The inconsiderate clerk who retains the lawful fees earned by a brother clerk and who puts the latter to the trouble of writing and complaining of his conduct, and sometimes to suing for the amount, is guilty of conduct at once inexcusable and reprehensible. Every clerk who values his position will of course avoid complaints of this contemptible character.

In some offices inspected I have found clerks still making charges in excess of the tariff of fees, notwithstanding the frequency with which the particular items enlarged had been brought under their notice and corrected. It is expected that the delinquents will make themselves more familiar with their duties in this respect by a more careful study of the tariff.

A duty which devolves upon clerks, and one which I regret to say, has been much overlooked, is in looking for proper return from their bailiffs more promptly. Clerks ought to enquire and inform themselves as to the cause of delay in making returns and exercise that general surveillance nececessary to prevent injury to the character of their courts. Where bailiffs are not vigilant in making returns, the forfeiture of fees should be exacted by the clerk. And the latter may endanger his position by a disregard of his duty in this respect. Bailiffs, when making returns of N. B., should give special particulars where possible.

The enlarging of the jurisdiction and the working of the recent changes and amendments in the law are all having a beneficial effect in serving the public interests, and the greater attention now being paid to the duties of outside inspection is having the effect of diminishing the number, and lessening the character of complaints against officers of the courts.

Remittances and Returns.

In spite of repeated directions to the contrary, there are clerks who in making their annual returns continue to send money and cheques, for amount of percentage on their emoluments, to this Department. All such remittances should be made direct to the Treasury Department, and all returns should be made promptly, and will in future be insisted upon within the time required by law, viz., the 15th of January.

When County to provide Books.

Numerous communications continue to be received asking when the county is bound to provide books for officers of courts.

Under sec. 1, cap. 12, 52 Victoria, where the fees and emoluments earned by the clerk or bailiff of any division court are less than $500 a year, the cost of all books required by the Division Courts Act to be kept by them shall be paid by the county in which such division court is situated.

The Tariff.

The tariff of fees of clerks and bailiffs is hereunto appended. Printed tariff cards, required to be hung up in clerk's offices, will be supplied upon application by this department.

I have the honour to be,

Your Honor's obedient servant,

JOS. DICKEY,

Inspector.

TABLES.

TABLE A.

RETURN of Division Court Business, from the First day of January to the Thirty-first day of December, A.D. 1890, inclusive, shewing:—

The Name of County, United Counties, or District.	Number of Divisions.	Number of suits entered, exclusive of Transcripts of Judgments and Judgment Summonses.	Amount of claims entered, exclusive of Transcripts of Judgments and Judgment Summonses.	Number of Transcripts of Judgments received from other Courts.	Amount of claims received by Transcripts of Judgments from other Courts.	Number of Judgment Summonses issued.	Total amount of Suitors' money paid into Court.	Total amount of Suitors' money paid out of Court.	Balance of Cash in Court.	Number of Suits entered, where the amount claimed exceeds $100.	Number of actions for Tort, where the amount claimed exceeds $10.	Number of actions of Replevin, where the value of the goods or other property or effects distrained, taken or detained, exceeds the sum of $10.	Number of Jury Trials by Juries summoned.	Amount paid to Jurors summoned.	Number of Jury Trials by Jurors, called in pursuance of Section 122 of "The Division Courts Act."	Amount payable to County Treasurer for "Division Court Jury Fund."	The amount of Fees and Emoluments payable to the Honourable the Treasurer for the use of the Province.	Number of instances in which the Judge has allowed costs to be taxed for Counsel, Attorney or Agents' Fees under Section 16 of "The Division Courts Acts," 1880.	The amount of costs so taxed.
			$ c.		$ c.		$ c.	$ c.	$ c.					$ c.		$ c.	$ c.		$ c.
ALGOMA	1	135	6168 72	13	1130 91	2	1512 00	1512 00	.....	16	....	....	....	.....	....	6 97	.....	.....	.....
	2	255	10038 84	6	449 88	3	2353 78	2353 78	.....	25	....	....	....	.....	....	10 96	.....	.....	.....
	3	154	4954 18	19	1060 22	10	2153 43	2067 24	95 89	5	2	1	....	.....	....	2 99	.....	.....	.....
	4	52	2804 40	7	65 85	7	356 50	356 50	.....	6	....	....	2	23 00	1	.....	.....	.....	.....
	5	77	2566 63	11	479 31	4	1190 80	1103 74	87 06	4	....	6	5	47 00	....	.....	.....	.....	.....
	6	37	1552 53	4	154 71	7	811 21	816 37	29 76	6	....	.....	1	13 00	....	.....	.....	.....	.....
		Left the District.																	
BRANT	1	703	29268 24	35	2081 63	93	7808 04	7557 85	250 19	89	1	1	9	53 00	....	38 06	99 98	5	25 00
	2	148	6126 87	10	136 39	21	2812 31	2798 31	14 00	9	....	1	....	.....	...	4 65	.....	2	10 00
	3	52	2804 40	7	65 85	7	356 50	.....	.....	6	.....	.....	2	23 00	....	3 45	.....	.....	.....
	4	77	2566 63	11	479 31	4	1190 80	1103 74	87 06	4	....	6	5	47 00	1	2 35	.....	2	20 00
	5	37	1552 53	4	154 71	7	811 21	816 37	29 76	6	....	.....	1	13 00	....	1 95	.....	.....	.....

RETURN of Division Court Business,—*Continued.*

THE NAME OF COUNTY, UNITED COUNTIES, OR DISTRICT.	Number of Divisions.	Number of suits entered, exclusive of Transcripts of Judgments and Judgment Summonses.	Amount of claims entered, exclusive of Transcripts of Judgments and Judgment Summonses.	Number of Transcripts of Judgments received from other Courts.	Amount of claims received by Transcripts of Judgments from other Courts.	Number of Judgment Summonses issued.	Total amount of Suitors' money paid into Court.	Total amount of Suitors' money paid out of Court.	Balance of Cash in Court.	Number of Suits entered, where the amount claimed exceeds $100.	Number of actions for Tort, where the amount claimed exceeds $40.	Number of actions of Replevin, where the value of the goods or other property or effects distrained, taken or detained, exceeds the sum of $40.	Number of Jury Trials by Juries summoned.	Amount paid to Jurors summoned.	Number of Jury Trials by Jurors, called in pursuance of Section 122 of "The Division Courts Act."	Amount payable to County Treasurer for "Division Court Jury Fund."	The amount of Fees and Emoluments payable to the Honourable the Treasurer for the use of the Province.	Number of instances in which the Judge has allowed costs to be taxed for Counsel, Attorney or Agents' Fees under Section 16 of "The Division Courts Act," 1880.	The amount of costs so taxed.
			$ c.		$ c.		$ c.	$ c.	$ c.					$ c.		$ c.	$ c.		$ c.
ALGOMA.....	6	544	21161 74	38	2641 01	15	6019 21	5933 02	95 89	46	2	1	....	....	....	20 92	.....	.....	.....
BRANT	5	1017	41318 67	67	2917 89	132	12978 86	12632 77	381 01	114	1	8	17	136 00	1	50 46	99 98	9	55 00
Carried forward...	11	1561	62480 41	105	5558 90	147	18998 07	18565 79	476 90	160	3	9	17	136 00	1	71 38	99 98	9	55 00

RETURN of Division Court Business.—*Continued.*

The Name of County, United Counties, or District.	Number of Divisions.	Number of suits entered, exclusive of Transcripts of Judgments and Judgment Summonses.	Amount of claims entered, exclusive of Transcripts of Judgments and Judgment Summonses.	Number of Transcripts of Judgments received from other Courts.	Amount of claims received by Transcripts of Judgments from other Courts.	Number of Judgment Summonses issued.	Total amount of Suitors' money paid into Court.	Total amount of Suitors' money paid out of Court.	Balance of Cash in Court.	Number of Suits entered, where the amount claimed exceeds $100.	Number of actions for Tort, where the amount claimed exceeds $40.	Number of actions of Replevin, where the value of the goods or other property or effects distrained, taken or detained, exceeds the sum of $40.	Number of Jury Trials by Juries summoned.	Amount paid to Jurors summoned.	Number of Jury Trials by Jurors, called in pursuance of Section 122 of "The Division Courts Act."	Amount payable to County Treasurer for "Division Court Jury Fund."	The amount of Fees and Emoluments payable to the Honourable the Treasurer for the use of the Province.	Number of instances in which the Judge has allowed costs to be taxed for Counsel, Attorney or Agents' Fees under Section 16 of "The Division Courts Act," 1880.	The amount of costs so taxed.
			$ c.		$ c.		$ c.	$ c.	$ c.					$ c.		$ c.	$ c.	$ c.	$ c.
Bruce	1	239	9018 96	15	593 44	40	3054 19	3163 18	349 89	17	4	...	...	.....	....	9 05	.....	1 00	5 00
	2	226	7158 41	7	220 84	13	4002 73	3337 21	65 52	14	...	...	...	.....	....	6 77	.....	1 00	10 00
	3	185	9225 50	18	636 84	18	3083 23	3063 34	19 89	22	3	...	3	11 00	....	9 28	.....	4 00	28 00
	4	193	6995 53	17	473 78	13	2434 62	2378 89	74 11	13	...	...	...	33 00	....	6 70	.....	.....	.....
	5	134	6078 36	20	1077 65	11	2921 04	2822 60	98 44	21	...	1	...	.....	....	7 41	.....	.....	.....
	6	47	2367 08	8	230 79	4	997 92	858 90	139 02	6	1	...	...	.....	....	2 58	.....	.....	.....
	7	113	3224 61	22	1689 82	16	1481 32	1459 77	21 55	6	4	1	1	5 00	....	3 00	.....	1 00	5 00
	8	305	10076 04	100	3461 35	28	3912 75	3642 18	270 57	9	1	...	...	.....	....	7 95	.....	.....	.....
	9	123	5478 01	3	258 04	9	1636 59	1636 59	.....	21	1	...	...	.....	....	7 02	.....	2 00	7 00
	10	57	2145 45	16	442 65	2	1005 72	996 11	58 63	2	...	...	...	.....	....	1 52	.....	.....	.....
Carleton	1	1702	71949 07	32	1488 13	575	14071 01	13511 01	799 51	153	10	2	...	.....	....	72 93	1148 60	18 00	110 00
	2	64	2786 30	5	442 68	4	719 70	719 70	.....	5	...	...	...	.....	....	2 78	.....	.....	.....
	3	89	2927 83	4	267 67	5	1748 52	1748 52	.....	6	...	...	...	.....	....	3 12	.....	.....	.....
	4	57	3457 00	10	491 00	6	1954 00	1797 00	243 00	11	...	...	2	23 00	....	3 95	.....	1 00	10 00
	5	51	2226 24	11	637 01	3	894 34	894 34	.....	6	...	...	...	.....	....	2 37	.....	.....	.....
	6	64	2075 50	13	267 42	...	934 25	934 25	.....	6	...	1	1	12 00	....	2 70	.....	.....	.....
	7	81	2338 02	9	323 57	12	1300 33	1263 98	36 35	2	...	...	...	.....	....	1 76	.....	.....	.....

RETURN of Division Court Business—*Continued.*

THE NAME OF COUNTY, UNITED COUNTIES, OR DISTRICT.	Number of Divisions.	Number of suits entered, exclusive of Transcripts of Judgments and Judgment Summonses.	Amount of claims entered, exclusive of Transcripts of Judgments and Judgment Summonses.	Number of Transcripts of Judgments received from other Courts.	Amount of claims received by Transcripts of Judgments from other Courts.	Number of Judgment Summonses issued.	Total amount of Suitors' money paid into Court.	Total amount of Suitors' money paid out of Court.	Balance of Cash in Court.	Number of Suits entered, where the amount claimed exceeds $100.	Number of actions for Tort, where the amount claimed exceeds $40.	Number of actions of Replevin, where the value of the goods or other property or effects distrained, taken, or detained, exceeds the sum of $40.	Number of Jury Trials by Juries summoned.	Amount paid to Jurors summoned.	Number of Jury Trials by Jurors called in pursuance of Section 122 of "The Division Courts Act."	Amount payable to County Treasurer for "Division Court Jury Fund."	The amount of Fees and Emoluments payable to the Honourable the Treasurer for the use of the Province.	Number of instances in which the Judge has allowed costs to be taxed for Counsel, Attorney or Agents' Fees under Section 16 of "The Division Courts Act," 1880.	The amount of costs so taxed.
			$ c.		$ c.		$ c.	$ c.	$ c.					$ c.		$ c.	$ c.		$ c.
Brought forward	11	1561	62480 41	105	5558 90	147	18998 07	18555 79	476 90	160	3	9	17	136 00	1	71 38	99 98	9	55 00
BRUCE	10	1622	61767 95	226	9084 60	154	24530 11	23958 77	1097 62	131	14	3	5	49 00	....	61 28	.....	9	55 00
CARLETON	7	2108	87759 96	84	3915 48	605	21622 15	20868 80	1078 86	189	10	3	3	35 00	....	89 61	1148 60	19	120 00
Carried forward	28	5291	212008 32	415	18558 98	906	65150 33	63393 36	2653 38	480	27	15	25	220 00	1	222 27	1248 58	37	230 00

RETURN of Division Court Business.—*Continued.*

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			$ c.		$ c.		$ c.	$ c.	$ c.					$ c.		$ c.	$ c.		$ c.
Dufferin	1	293	17695 41	35	2966 03	31	1801 17	2090 62	119 88	37	....	.....	2	32 00	....	15 09	.....	1	7 50
	2	230	8664 96	38	2733 59	39	2978 85	2461 07	17 78	22	1	.....	....	.....	....	9 91	.....	.....	.....
	3	117	4081 00	12	807 50	15	1522 05	1379 07	329 45	7	1	.....	....	.....	....	3 67	.....	1	10 00
	4	54	2042 50	4	181 51	1	1400 43	1400 43	.....	5	....	.....	1	11 00	....	2 36	.....	.....	.....
	5	108	3988 62	12	962 86	9	1751 82	1751 82	.....	13	....	.....	2	18 00	1	5 53	.....	.....	.....
Elgin	1	502	16043 03	40	1985 26	58	7424 35	7370 94	193 20	30	....	1	1	11 00	....	12 95	19 08	1	10 00
	2	64	2591 68	5	277 04	3	564 15	516 50	28 65	4	1	1	1	12 00	....	2 35	.....	.....	.....
	3	515	14586 06	35	1691 97	51	6728 88	6555 28	173 60	24	5	....	....	.....	....	14 31	14 82	.....	.....
	4	428	18309 28	31	2024 88	35	6651 47	6139 50	511 97	49	2	.....	....	.....	1	19 75	.....	1	10 00
Essex	1	162	3853 23	3	246 38	39	1478 39	1511 93	.....	7	....	.....	....	.....	....	3 16	.....	.....	.....
	2	224	8936 42	12	769 68	15	2191 32	2154 71	311 86	20	....	2	....	.....	....	9 17	.....	.....	5 00
	3	146	5897 65	13	248 16	21	2955 02	2776 45	242 37	14	....	.....	....	.....	....	6 17	.....	1	4 00
	4	178	4727 34	9	459 65	18	1909 71	1884 88	339 51	11	....	.....	....	.....	....	4 85	.....	2	15 00
	5	315	12786 84	23	1317 78	58	5764 20	5676 58	87 62	36	....	1	....	.....	....	14 01	.....	1	5 00
	6	238	8559 91	17	1059 48	42	3450 51	3493 78	35 05	11	....	.....	....	.....	....	7 55	.....	1	6 00
	7	462	20411 45	44	2661 91	116	5150 86	5273 49	185 98	48	4	.....	3	25 00	1	21 88	44 67	2	15 00
	8	473	22529 53	35	1482 90	141	8228 41	8016 06	318 98	55	....	.....	1	7 00	....	22 66	29 03	3	16 00

RETURN of Division Court Business.—*Continued.*

THE NAME OF COUNTY, UNITED COUNTIES, OR DISTRICT.	Number of Divisions.	Number of suits entered, exclusive of Transcripts of Judgments and Judgment Summonses.	Amount of claims entered, exclusive of Transcripts of Judgments and Judgment Summonses.	Number of Transcripts of Judgments received from other Courts.	Amount of claims received by Transcripts of Judgments from other Courts.	Number of Judgment Summonses issued.	Total amount of Suitors' money paid into Court.	Total amount of Suitors' money paid out of Court.	Balance of Cash in Court.	Number of Suits entered, where the amount claimed exceeds $100.	Number of actions for Tort, where the amount claimed exceeds $40.	Number of actions of Replevin, where the value of the goods or other property or effects distrained, taken or detained, exceeds the sum of $40.	Number of Jury Trials by Juries summoned.	Amount paid to Juries summoned.	Number of Jury Trials by Jurors, called in pursuance of Section 122 of "The Division Courts Act."	Amount payable to County Treasurer for "Division Court Jury Fund."	The amount of Fees and Emoluments payable to the Honourable the Treasurer for the use of the Province.	Number of instances in which the Judge has allowed costs to be taxed for Counsel, Attorney or Agents' Fees under Section 16 of "The Division Courts Act," 1880.	The amount of costs so taxed.
			$ c.		$ c.		$ c.	$ c.	$ c.					$ c.		$ c.	$ c.		$ c.
Brought forward..	28	5291	212008 32	415	18558 98	906	65150 33	63393 36	2653 38	480	27	15	25	220 00	1	222 27	1248 58	37	230 00
DUFFERIN	5	802	36472 49	101	7651 49	95	9454 32	9583 01	467 11	84	2	1	5	61 00	1	35 56	.....	2	17 50
ELGIN.....	4	509	51530 65	111	5979 15	147	21368 85	20582 22	907 42	107	8	2	2	23 00	1	49 36	33 90	2	20 00
ESSEX.....	8	2198	87702 37	56	8245 94	450	31128 42	30787 93	1521 37	202	4	3	4	32 00	1	89 45	-73 70	11	66 00
Carried forward..	45	8800	387713 23	683	40435 56	1598	127101 92	124346 52	5549 28	873	41	21	36	336 00	4	397 64	1356 18	52	333 50

RETURN of Division Court Business.—*Continued.*

THE NAME OF COUNTY, UNITED COUNTIES, OR DISTRICT.		Number of Divisions.	Number of suits entered, exclusive of Transcripts of Judgments and Judgment Summonses.	Amount of claims entered, exclusive of Transcripts of Judgments and Judgment Summonses.	Number of Transcripts of Judgments received from other Courts.	Amount of Claims received by Transcripts of Judgments from other Courts.	Number of Judgment Summonses issued.	Total amount of Suitors' money paid into Court.	Total amount of Suitors' money paid out of Court.	Balance of Cash in Court.	Number of Suits entered, where the amount claimed exceeds $100.	Number of actions for Tort, where the amount claimed exceeds $40.	Number of actions of Replevin, where the value of the goods or other property or effects distrained, taken or detained, exceeds the sum of $40.	Number of Jury Trials by Juries summoned.	Amount paid to Jurors summoned.	Number of Jury Trials by Jurors, called in pursuance of Section 122 of "The Division Courts Act."	Amount payable to County Treasurer for "Division Court Jury Fund."	The amount of Fees and Emoluments payable to the Honourable the Treasurer for the use of the Province.	Number of instances in which the Judge has allowed Fees under Section 16 of "The Division Courts Act," 1880.	Amount of costs so taxed.
				$ c.		$ c.		$ c.	$ c.	$ c.					$ c.		$ c.		$ c.	$ c.
FRONTENAC.....	1	1	713	32185 48	31	1749 06	66	12050 53	11616 89	1673 71	87	4	....	6	16 00	....	36 69	155 58	1	10 00
	2	2	36	1279 91	....	....	2	457 23	443 96	135 62	2	1	.....	....	.....	....	1 13	.....	.....	.....
	3	3	61	1522 52	4	28 05	6	976 68	964 18	12 46	1	2	.....	....	.....	....	1 12	.....	.....	.....
	4	4	153	4827 38	4	288 64	51	1559 24	1559 24	63 84	9	....	.....	....	.....	....	4 53	.....	1	8 00
	5	5	38	931 18	2	8 55	....	350 36	350 36	.....	2	....	.....	....	.....	....	80	.....	.....	.....
	6	6	146	5915 32	7	268 85	49	849 81	837 42	12 39	7	....	.....	1	11 00	....	4 21	.....	.....	.....
GREY.....	1	1	788	21153 55	50	2715 36	220	9632 74	9632 74	.....	41	....	.....	6	63 00	....	23 54	316 22	4	30 00
	2	2	138	3896 59	12	554 49	11	3080 53	3026 62	53 91	16	1	.....	....	.....	....	6 61	.....	2	10 00
	3	3	173	7962 87	15	791 17	47	1455 40	1457 40	36 72	21	....	.....	....	.....	....	8 64	.....	6	50 00
	4	4	229	12441 80	22	1463 94	30	4790 38	4859 16	51 48	45	....	1	....	.....	....	14 97	.....	18	104 00
	5	5	203	7107 85	17	972 91	26	3421 91	3309 21	136 12	13	...	1	2	23 00	....	6 52	.....	1	10 00
	6	6	109	3825 16	12	578 12	8	2066 54	2137 21	319 12	4	2	.....	....	.....	....	3 67	.....	1	10 00
	7	7	143	4704 02	13	580 42	11	2749 47	2749 47	.....	9	1	.....	....	.....	....	4 65	.....	1	10 00
	8	8	110	3895 67	9	406 02	26	1371 86	1362 94	8 92	6	1	.....	1	12 00	....	3 42	.....	.....	.....

RETURN of Division Court Business.—*Continued.*

THE NAME OF COUNTY, UNITED COUNTIES, OR DISTRICT.	Number of Divisions.	Number of suits entered, exclusive of Transcripts of Judgments and Judgment Summonses.	Amount of claims entered, exclusive of Transcripts of Judgments and Judgment Summonses.	Number of Transcripts of Judgments received from other Courts.	Amount of Claims received by Transcripts of Judgments from other Courts.	Number of Judgment Summonses issued.	Total amount of Suitors' money paid into Court.	Total amount of Suitors money paid out of Court.	Balance of Cash in Court.	Number of Suits entered, where the amount claimed exceeds $100.	Number of actions for Tort, where the amount claimed exceeds $40.	Number of actions of Replevin, where the value of the goods or other property or effects distrained, taken or detained, exceeds the sum of $40.	Number of Jury Trials by Juries summoned.	Amount paid to Jurors summoned.	Number of Jury Trials by Jurors, called in pursuance of Section 122 of "The Division Courts Act."	Amount payable to County Treasurer for "Division Court Jury Fund."	The amount of Fees and Emoluments payable to the Honourable the Treasurer for the use of the Province.	Number of instances in which the Judge has allowed costs to be taxed for Counsel, Attorney or Agents' Fees under Section 16 of "The Division Courts Act," 1880.	The amount of costs so taxed.
			$ c.		$ c.		$ c.	$ c.	$ c.					$ c.		$ c.	$ c.		$ c.
Brought forward...	45	8800	387713 23	633	40435 56	1598	127101 92	124346 52	5549 28	873	41	21	36	336 00	4	397 64	1356 18	52	333 50
FRONTENAC.....	6	1147	46661 79	48	2343 15	174	16243 85	15772 05	1898 02	108	7	.....	7	27 00	....	48 48	155 58	2	18 00
GREY.....	8	1803	64987 51	150	8062 43	379	28568 83	28534 75	606 27	155	5	2	9	98 00	....	72 02	316 22	33	224 00
Carried forward....	59	11840	499362 53	881	50841 14	2151	171914 60	168653 82	8053 57	1136	53	23	52	461 00	4	518 14	1827 98	87	575 50

Return of Division Court Business.—*Continued.*

The Name of County, United Counties, or District.	Number of Divisions.	Number of suits entered, exclusive of Transcripts of Judgments and Judgment Summonses.	Amount of claims entered, exclusive of Transcripts of Judgments and Judgment Summonses.	Number of Transcripts of Judgments received from other Courts.	Amount of claims received by Transcripts of Judgments from other Courts.	Number of Judgment Summonses issued.	Total amount of Suitors' money paid into Court.	Total amount of Suitors' money paid out of Court.	Balance of Cash in Court.	Number of Suits entered, where the amount claimed exceeds $100.	Number of actions for Tort, where the amount claimed exceeds $40.	Number of actions of Replevin, where the value of the goods or other property or effects distrained, taken or detained, exceeds the sum of $40.	Number of Jury Trials by Juries summoned.	Amount paid to Jurors summoned.	Number of Jury Trials by Jurors, called in pursuance of Section 122 of "The Division Courts Act."	Amount payable to County Treasurer for "Division Court Jury Fund."	The amount of Fees and Emoluments payable to the Honourable the Treasurer for the use of the Province.	Number of instances in which the Judge has allowed costs to be taxed for Counsel, Attorney or Agents' Fees under Section 16 of "The Division Courts Act," 1880.	The amount of costs so taxed.
			$ c.		$ c.		$ c.	$ c.	$ c.					$ c.		$ c.	$ c.		$ c.
Haldimand.....	1	52	2254 03	6	162 11	2	971 72	1003 89	6 00	7	3		3	36 00		2 68			
	2	44	1781 32	2	102 27	1	470 18	470 18		28			3	36 00		1 36			
	3	245	8320 33	21	921 52	7	2250 60	1976 51	349 01	26						10 13		2 00	10 00
	4	19	619 13	3	182 50		98 50	98 50		2						74			
	5	28	662 49	5	300 44		747 71	747 71					1	12 00		48			
	6	158	6650 60	35	1205 98	15	2671 14	2189 03	182 03	14			1	6 00		6 53			
Haliburton	1	57	1716 90	8	285 41	2	581 19	545 74	35 45	18						1 08			
	2	33	960 46	1	63 15		381 68	362 71	18 97	2						80			
	3	37	924 39	6	227 60	1	263 78	256 78	7 00	1						76			
Halton.....	1	153	6595 68	13	772 09	45	3206 68	3205 89	147 05	18		1				7 38		1 00	8 00
	2	88	2886 73	9	127 39	9	1954 12	1915 02	39 10	6		1				3 30			
	3	155	5334 88	16	689 22	38	2593 88	2593 88		13		1				5 56		2 00	10 00
	4	71	3680 14	9	474 22	7	666 22	646 12	20 10	1						1 27			
	5	20	886 14	2	63 24		346 67	319 83	26 84	2						83		1 00	8 00
	6	65	3227 41	11	900 04	11	1168 31	1167 91	40	12						3 99			

RETURN of Division Court Business—*Continued.*

THE NAME OF COUNTY, UNITED COUNTIES, OR DISTRICT.	Number of Divisions.	Number of suits entered, exclusive of Transcripts of Judgments and Judgment Summonses.	Amount of claims entered, exclusive of Transcripts of Judgments and Judgment Summonses.	Number of Transcripts of Judgments received from other Courts.	Amount of claims received by Transcripts of Judgments from other Courts.	Number of Judgment Summonses issued.	Total amount of Suitors' money paid into Court.	Total amount of Suitors' money paid out of Court.	Balance of Cash in Court.	Number of Suits entered, where the amount claimed exceeds $100.	Number of actions for Tort, where the amount claimed exceeds $40.	Number of actions of Replevin, where the value of the goods or other property or effects distrained, taken or detained, exceeds the sum of $40.	Number of Jury Trials by Juries summoned.	Amount paid to Jurors summoned.	Number of Jury Trials by Jurors, called in pursuance of Section 122 of "The Division Courts Act."	Amount payable to County Treasurer for "Division Court Jury Fund."	The amount of Fees and Emoluments payable to the Honourable the Treasurer for the use of the Province.	Number of instances in which the Judge has allowed costs to be taxed for Counsel, Attorney or Agents' Fees under Section 16 of "The Division Courts Act," 1880.	The amount of costs so taxed.
			$ c.		$ c.		$ c.	$ c.	$ c.					$ c.		$ c.	$ c.		$ c.
Brought forward.	59	11840	499362 53	881	50841 14	2151	171914 60	168653 32	8053 57	1136	53	23	52	461 00	4	518 14	1827 98	87 00	575 50
HALIBURTON	6	546	20287 90	72	2874 82	25	7209 85	6785 82	537 04	77	3	.....	8	90 00	....	21 92	.....	2 00	10 00
HALIBURTON	3	127	3601 75	15	576 16	3	1226 65	1165 23	61 42	3	....	.....	.....	.....	....	2 64	.....	.....	.....
HALTON	6	552	22610 98	60	3026 20	110	9935 88	9848 65	233 49	52	....	2	.....	.....	....	22 33	.....	4 00	26 00
Carried forward.	74	13065	545863 16	1028	57318 32	2289	190286 98	186453 02	8885 52	1268	56	25	60	551 00	4	565 03	1827 98	93 00	611 50

RETURN of Division Court Business.—*Continued.*

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			$ c.		$ c.		$ c.	$ c.	$ c.					$ c.		$ c.	$ c.		$ c.
HASTINGS	1	528	28151 33	26	1458 19	22	6315 22	6201 62	113 60	99	....	2	13	55	1	33 87	.....	17	118 00
	2	29	849 49	....	.....	5	544 12	509 60	34 52	2	....	.....	.....	.....	.....	0 89	.....	.....	.....
	3	53	1859 23	4	173 24	2	903 52	827 54	75 98	2	....	.....	.....	.....	.....	1 30	.....	.....	.....
	4	176	6077 75	6	299 82	12	2435 50	2356 11	79 39	12	....	.....	.....	.....	.....	6 10	.....	.....	.....
	5	254	8086 41	4	50 67	6	2809 06	2938 94	.....	18	1	.....	1	10	.....	8 31	.....	1	10 00
	6	239	9118 85	111	465 27	12	2698 84	2541 68	157 16	22	....	1	.....	.....	.....	9 97	.....	.....	.....
	7	150	2689 27	12	556 09	23	1276 39	1281 63	16 03	4	2	.....	1	10	.....	1 93	.....	.....	.....
	8	107	3764 06	1	15 12	5	941 38	916 33	25 05	12	....	.....	.....	.....	.....	4 29	.....	.....	.....
	9	356	13528 14	22	743 72	26	2403 41	2445 73	41 63	21	3	.....	.....	33	.....	12 42	.....	4	30 00
	10	145	3171 48	15	536 51	23	832 92	832 92	.....	3	....	.....	.....	.....	.....	2 55	.....	.....	.....
	11	38	961 20	3	183 73	3	278 50	323 90	44 65	2	....	.....	.....	.....	.....	2 95	.....	.....	.....
	12	87	3463 31	12	594 13	....	1191 39	1244 91	4 09	6	2	.....	.....	.....	.....	0 94	.....	1	5 00
HURON	1	343	8735 09	12	592 14	117	2580 96	2527 68	233 28	15	....	.....	1	11	....	8 10	17 16	3	9 00
	2	180	6990 86	17	500 51	29	4765 98	4765 98	16 37	13	1	.....	.....	.....	.....	7 63	.....	.....	.....
	3	204	9747 50	9	640 20	19	1739 52	1739 52	.....	31	1	.....	21	18	.....	11 02	.....	.....	.....
	4	152	6109 26	15	871 87	....	2299 07	2211 19	87 88	30	2	.....	2	13	.....	9 99	.....	.....	.....

RETURN of Division Court Business.—*Continued.*

THE NAME OF COUNTY, UNITED COUNTIES, OR DISTRICT.	Number of Divisions.	Number of suits entered, exclusive of Transcripts of Judgments and Judgment Summonses.	Amount of claims entered, exclusive of Transcripts of Judgments received from other Courts.	Number of Transcripts of Judgments received from other Courts.	Amount of claims received by Transcripts of Judgments from other Courts.	Number of Judgment Summonses issued.	Total amount of Suitors' money paid into Court.	Total amount of Suitors' money paid out of Court.	Balance of Cash in Court.	Number of Suits entered, where the amount claimed exceeds $100.	Number of actions for Tort, where the amount claimed exceeds $40.	Number of actions of Replevin, where the value of the goods or other property or effects distrained, taken or detained, exceeds the sum of $40.	Number of Jury Trials by Juries summoned.	Amount paid to Jurors summoned.	Number of Jury Trials by Jurors, called in pursuance of Section 122 of "The Division Courts Act."	Amount payable to County Treasurer for "Division Court Jury Fund."	The amount of Fees and Emoluments payable to the Honourable the Treasurer for the use of the Province.	Number of instances in which the Judge has allowed costs to be taxed for Counsel, Attorney or Agents' Fees under Section 16 of "The Division Courts Act," 1880.	The amount of costs so taxed.
			$ c.		$ c.		$ c.	$ c.	$ c.					$ c.		$ c.	$ c.		$ c.
Brought forward...	74	13065	57318 32	1028	2604 72	2289	190286 98	186453 02	8885 52	1268	56	25	60	551 00	4	565 03	1827 98	93	611 50
HASTINGS	12	2162	5076 49	116	2604 72	139	22630 25	22420 91	591 50	203	8	3	18	108 00	1	85 52	.....	23	163 00
HURON	....	879	2604 72	53	2604 72	165	11385 53	11244 37	337 53	89	4	.....	5	42 00	.....	36 74	17 16	3	9 00
Carried forward....	86	16106	64999 53	1197	2604 72	2593	224302 76	220118 30	9814 55	1560	68	28	83	701 00	5	687 29	1845 14	119	783 50

RETURN of Division Court Business.—*Continued.*

The Name of County, United Counties, or District.	Number of Divisions.	Number of suits entered, exclusive of Transcripts of Judgments and Judgment Summonses.	Amount of claims entered, exclusive of Transcripts of Judgments and Judgment Summonses.	Number of Transcripts of Judgments received from other Courts.	Amount of claims received by Transcripts of Judgments from other Courts.	Number of Judgment Summonses issued.	Total amount of Suitors' money paid into Court.	Total amount of Suitors' money paid out of Court.	Balance of Cash in Court.	Number of Suits entered, where the amount claimed exceeds $100.	Number of actions for Tort, where the amount claimed exceeds $40.	Number of actions of Replevin, where the value of the goods or other property or effects distrained, taken or detained, exceeds the sum of $40.	Number of Jury Trials by Juries summoned.	Amount paid to Jurors summoned.	Number of Jury Trials by Juries, called in pursuance of Section 122 of "The Division Courts Act"	Amounts payable to County Treasurer for Division Court Jury Fund."	The amount of Fees and Emoluments payable to the Honourable the Treasurer for the use of the Province.	Number of instances in which the Judge has allowed costs to be taxed for Counsel, Attorney or Agents' Fees under Section 16 of "The Division Courts Act," 1880.	The amount of costs so taxed.
			$ c.		$ c.		$ c.	$ c.	$ c.					$ c.		$ c.	$ c.		$ c.
HURON—*Con.*	5	88	4884 76	6	158 22	4	1901 36	1871 40	29 99	20	....	....	....	....	....	6 77	.....	2	8 00
	6	98	4026 13	5	93 69	5	1083 13	1021 91	61 22	8	2	.....	.....	.....	.....	3 89	.....	.....	.....
	7	42	1852 09	8	642 80	1	1326 09	1326 09	.....	1	....	.....	....	12 00	....	1 09	.....	.....	15 00
	8	132	5308 67	16	585 61	11	2708 00	2675 92	32 08	10	....	.....	1	.....	....	5 17	.....	1	5 00
	9	62	1694 36	11	619 88	....	1186 77	1258 17	56 88	....	....	.....	....	.....	....	93	.....	.....	.....
	10	61	1999 90	4	213 29	5	1049 76	1033 56	16 20	4	....	.....	....	.....	....	2 02	.....	1	5 00
	11	93	4523 18	..	.....	1	1711 22	1675 30	35 92	11	1	1	....	.....	....	4 34	.....	1	5 00
	12	64	2660 50	14	684 19	8	1401 20	1380 22	58 00	5	....	.....	....	.....	....	2 51	.....	1	5 00
KENT	1	425	22839 95	31	1500 42	124	8597 95	8200 20	397 75	59	2	.....	1	10 00	....	25 07	39 96	3	15 00
	2	354	9925 57	40	2156 05	120	2787 84	2725 64	62 20	13	1	1	....	.....	....	9 41	.....	.....	.....
	3	286	9724 91	26	1617 67	49	4943 75	4936 69	15 16	18	....	.....	....	.....	....	9 33	.....	1	5 00
	4	118	4651 15	9	525 35	15	1934 92	1934 92	.....	10	1	.....	1	11 00	....	4 87	.....	1	10 00
	5	456	16300 99	39	1975 78	70	4450 65	4375 06	167 14	31	....	1	1	.....	....	15 37	17 27	4	30 00
	6	156	6399 45	23	1837 08	49	1848 34	1808 34	40 00	8	5	.....	....	.....	....	4 58	.....	.....	.....
	7	354	9970 19	62	2040 93	35	3843 04	3663 83	542 85	9	2	.....	....	.....	....	7 23	.....	1	5 00

RETURN of Division Court Business.—*Continued.*

THE NAME OF COUNTY, UNITED COUNTIES, OR DISTRICT.	Number of Divisions.	Number of suits entered, exclusive of Transcripts of Judgments and Judgment Summonses.	Amount of claims entered, exclusive of Transcripts of Judgments and Judgment Summonses.	Number of Transcripts of Judgments received from other Courts.	Number of claims received by Transcripts of Judgments from other Courts.	Number of Judgment Summonses issued.	Total amount of Suitors' money paid into Court.	Total amount of Suitors' money paid out of Court.	Balance of Cash in Court.	Number of Suits entered, where the amount claimed exceeds $100.	Number of actions for Tort, where the amount claimed exceeds $40.	Number of actions for Replevin, where the value of the goods or other property or effects distrained, taken or detained, exceeds the sum of $10.	Number of Jury Trials by Juries summoned.	Amount paid to Jurors summoned.	Number of Jury Trials by Jurors, called in pursuance of Section 122 of "The Division Courts Act."	Amount payable to County Treasurer for "Division Court Jury Fund."	The amount of Fees and Emoluments payable to the Honourable the Treasurer for the use of the Province.	Number of instances in which the Judge has allowed Fees under Section 16 of "The Division Courts Act," 1880	The amount of costs so taxed.
			$ c.		$ c.		$ c.	$ c.	$ c.					$ c.		$ c.	$ c.		$ c.
Brought forward..	86	16106	659466 41	1197	64999 53	2593	220118 30	9814 55	290 29	1560	68	28	83	701 00	5	687 29	1845 14	8	783 50
HURON—*Con.*.....	12	640	26949 59	64	2997 68	35	12242 57	1235 10	148	59	3	3	1	12 00	....	26 75	.....		43 00
KENT.....	7	2149	79812 21	230	11653 28	462	27644 68	1925 10	148	59	11	3	2	21 00	....	75 86	57 23	10	65 00
Carried forward..	105	18895	766228 21	1491	79650 49	3090	260005 55	11329 94	1707	82	34	86		734 00	5	789 90	1902 37	137	891 50

RETURN of Division Court Business.—*Continued.*

THE NAME OF COUNTY, UNITED COUNTIES, OR DISTRICT.	Number of Divisions.	Number of suits entered, exclusive of Transcripts of Judgments and Judgment Summonses.	Amount of claims entered, exclusive of Transcripts of Judgments and Judgment Summonses.	Number of Transcripts of Judgments received from other Courts.	Amount of Claims received by Transcripts of Judgments from other Courts.	Number of Judgment Summonses issued.	Total amount of Suitors' money paid into Court.	Total amount of Suitors' money paid out of Court.	Balance of Cash in Court.	Number of Suits entered, where the amount claimed exceeds $100.	Number of actions for Tort, where the amount claimed exceeds $40.	Number of actions of Replevin, where the value of the goods or other property or effects distrained, taken or detained, exceeds the sum of $40.	Number of Jury Trials by Juries summoned.	Amount paid to Jurors summoned.	Number of Jury Trials by Jurors called in pursuance of Section 122 of "The Division Courts Act."	Amount payable to County Treasurer for "Division Court Jury Fund."	The amount of Fees and Emoluments payable to the Honourable the Treasurer for the use of the Province.	Number of instances in which the Judge has allowed costs to be taxed for Counsel, Attorney or Agents' Fees under Section 16 of "The Division Courts Act," 1880.	The amount of costs so taxed.
			$ c.		$ c.		$ c.	$ c.	$ c.					$ c.		$ c.	$ c.		$ c.
AMBTON.....	1	334	11977 52	33	1149 42	26	3861 62	3771 70	104 31	22	1	1	2	20 00	....	9 61	.....	6	23 00
	2	143	5936 76	8	468 59	16	2198 53	2122 23	76 30	10	1	1	.....	.....	....	4 00	.....	2	20 00
	3	126	3551 46	26	1812 49	9	2966 04	2938 43	41 04	2	1	....	.....	.....	....	2 75	.....	.....	.....
	4	107	4956 30	26	283 43	4	2326 10	2326 10	.....	12	3	....	2	.....	....	5 46	.....	2	14 00
	5	223	9645 27	13	406 74	3	2585 21	2621 21	.....	29	...	.....	1	12 00	....	11 36	.....	1	5 00
	6	69	2153 92	3	55 89	13	1050 07	1021 69	28 38	2	2	.....	.....	.....	....	1 76	.....	1	2 00
	7	89	4472 27	10	400 78	....	1320 55	1257 83	62 72	12	....	.....	1	10 00	....	4 89	.....	3	28 00
	8	338	11892 17	36	2004 23	56	5712 27	5799 62	198 49	19	....	.....	.....	.....	....	10 75	.....	1	10 00
	9	181	3957 40	9	470 07	13	2426 32	2444 23	2 09	8	2	.....	.....	.....	....	4 61	.....	1	2 00
LANARK.....	1	245	7397 62	5	182 45	59	2064 32	2015 38	73 92	14	....	.....	....	.....	....	7 04	.....	4	22 50
	2	81	2565 44	4	238 36	13	782 11	708 97	36 57	3	...	.....	....	.....	....	2 31	.....	.....	.....
	3	205	6360 73	10	647 52	47	1759 82	1760 82	.....	7	1	.....	....	.....	....	5 02	.....	3	12 00
	4	293	7139 85	21	1145 41	86	2963 72	2943 90	19 82	17	....	.....	....	.....	....	4 73	.....	3	12 00
	5	37	1145 20	2	177 74	1	389 73	388 73	1 00	....	....	.....	....	.....	....	0 87	.....	.....	.....
	6	186	4156 31	6	267 16	39	1261 45	1261 45	.....	4	....	.....	....	.....	....	3 16	.....	.....	.....

RETURN of Division Court Business.—*Continued.*

THE NAME OF COUNTY, UNITED COUNTIES, OR DISTRICT.	Number of Divisions.	Number of suits entered, exclusive of Transcripts of Judgments and Judgment Summonses.	Amount of claims entered, exclusive of Transcripts of Judgments and Judgment Summonses.		Number of Transcripts of Judgments received from other Courts.	Amount of claims received by Transcripts of Judgments from other Courts.		Number of Judgment Summonses issued.	Total amount of Suitors' money paid into Court.		Total amount of Suitors' money paid out of Court.		Balance of Cash in Court.		Number of suits entered, where the amount claimed exceeds $100.	Number of actions for Tort, where the amount claimed exceeds $40.	Number of actions of Replevin, where the value of the goods or other property or effects distrained, taken or detained, exceeds the sum of $40.	Number of Jury Trials by Juries summoned.	Amount paid to Jurors summoned.		Number of Jury Trials by Jurors, called in pursuance of Section 122 of "The Division Courts Act."	Amount payable to County Treasurer for "Division Court Jury Fund."		The amount of Fees and Emoluments payable to the Honourable the Treasurer for the use of the Province.		Number of instances in which the Judge has allowed costs to be taxed for Counsel, Attorney or Agents' Fees under Section 16 of "The Division Courts Act," 1880.	The amount of costs so taxed.	
			$	c.		$	c.		$	c.	$	c.	$	c.					$	c.		$	c.		$	c.		$	c.
Brought forward ...	106	18895	766228	21	1491	79650	49	3060	265076	78	260005	55	11329	94	1767	82	34	86	734	00	5	789	90	1902	37	137	891	50
LAMBTON.....	9	1610	58543	07	164	7051	64	140	24446	71	24303	04	513	33	116	10	4	4	42	00	....	55	13	.....		17	104	00
LANARK.....	6	1047	28765	15	48	2658	64	245	9221	15	9079	25	131	31	45	1	.....	.....	.....		.....	23	13	.....		10	46	50
Carried forward ...	120	21552	853536	43	1703	89360	77	3475	298744	64	298387	84	11974	58	1928	93	38	90	776	00	5	868	16	1502	37	164	1042	00

RETURN of Division Court Business.—*Continued.*

The Name of County, United Counties, or District.	Number of Division.	Number of suits entered, exclusive of Transcripts of Judgments and Judgment Summonses.	Amount of claims entered, exclusive of Transcripts of Judgments and Judgment Summonses.	Number of Transcripts of Judgments received from other Courts.	Amount of claims received by Transcripts of Judgments from other Courts.	Number of Judgment Summonses issued.	Total amount of Suitors' money paid into Court.	Total amount of Suitors' money paid out of Court.	Balance of Cash in Court.	Number of Suits entered, where the amount claimed exceeds $100.	Number of actions for Tort, where the amount claimed exceeds $40.	Number of actions of Replevin, where the value of the goods or other property or effects distrained, taken or detained, exceeds the sum of $40.	Number of Jury Trials by Juries summoned.	Amount paid to Jurors summoned.	Number of Jury Trials by Juror, called in pursuance of Section 122 of "The Division Courts Act."	Amount payable to County Treasurer for "Division Court Jury Fund."	The amount of Fees and Emoluments payable to the Honourable the Treasurer for the use of the Province.	Number of instances in which the Judge has allowed costs to be taxed for Counsel, Attorney or Agents' Fees under Section 16 of "The Division Courts Act," 1880.	The amount of costs so taxed.
			$ c.		$ c.		$ c.	$ c.	$ c.					$ c.		$ c.	$ c.		$ c.
LEEDS AND GRENVILLE.....	1	619	21291 43	24	1370 77	103	9918 00	9562 77	1477 89	44	....	1	....	8 00	....	20 63	42 07	....	.....
	2	223	6929 78	5	249 60	42	3989 89	4297 02	123 29	13	....	1	....	.....	....	7 12	.....	1	7 00
	3	338	13984 54	14	900 02	48	2536 93	2158 18	78 75	21	1	1	....	.....	5	12 25	.....	4	15 00
	4	192	5817 74	10	578 45	42	2344 18	2293 25	73 35	12	....	....	....	.....	1	5 82	.....	4	.....
	5	111	2573 00	6	360 41	9	1529 80	1529 80	.....	5	3	.....	1	12 00	....	2 96	.....	3	15 00
	6	189	5674 41	4	286 57	44	1551 09	1435 69	125 40	7	....	.....	....	.....	....	4 66	.....	3	9 00
	7	94	2771 67	2	33 79	8	1153 70	1104 68	109 77	7	....	.....	....	.....	1	2 89	.....	1	10 00
	8	118	3976 53	9	592 60	24	1461 65	1461 65	.....	5	1	.....	....	.....	....	3 77	.....	....	.....
	9	188	4655 76	....	.....	25	2960 25	2845 13	115 12	6	1	1	....	.....	1	3 84	.....	3	14 00
	10	40	1371 00	4	217 12	1	694 07	670 73	23 34	1	1	.....	....	.....	....	1 00	.....	....	.....
	11	54	1625 81	....	.....	2	1220 77	1218 77	2 00	2	1	.....	....	.....	....	1 25	.....	....	.....
	12	51	1758 81	4	75 31	4	1685 77	1675 85	9 92	4	....	.....	....	.....	1	1 87	.....	....	.....
LENNOX AND ADDINGTON....	1	255	9826 84	12	702 83	50	3478 85	3399 49	79 36	21	1	.....	1	8 00	....	9 45	.....	5	29 00
	2	67	2315 35	1	30 00	6	728 21	691 15	37 06	8	....	.....	....	.....	....	3 08	.....	....	.....
	3	10	.....	2	10 61	1	72 00	72 00	.....	1	....	.....	....	.....	....	43	.....	....	.....
	4	157	4721 84	5	110 19	31	1097 49	1048 01	73 48	6	....	.....	....	.....	1	3 87	.....	1	5 00
	5	74	2520 89	4	261 10	14	896 65	915 76	.....	5	....	.....	1	12 00	....	2 48	.....	....	.....
	6	58	1912 53	2	188 13	11	957 09	945 39	11 70	4	....	.....	....	.....	....	1 57	.....	1	7 00
	7	119	4694 97	5	201 24	12	1073 02	1103 74	36 33	10	....	.....	....	.....	....	4 63	.....	1	5 00

RETURN of Division Court Business,—*Continued.*

THE NAME OF COUNTY, UNITED COUNTIES, OR DISTRICT.	Number of Divisions.	Number of suits entered, exclusive of Transcripts of Judgments and Judgment Summonses.	Amount of claims entered, exclusive of Transcripts of Judgments and Judgment Summonses.	Number of Transcripts of Judgments received from other Courts.	Amount of claims received by Transcripts of Judgments from other Courts.	Number of Judgment Summonses issued.	Total amount of Suitors' money paid into Court.	Total amount of Suitors' money paid out of Court.	Balance of Cash in Court.	Number of Suits entered, where the amount claimed exceeds $100.	Number of actions for Tort, where the amount claimed exceeds $40.	Number of actions of Replevin, where the value of the goods or other property or effects distrained, taken or detained, exceeds the sum of $40.	Number of Jury Trials by Juries summoned.	Amount paid to Jurors summoned.	Number of Jury Trials by Jurors, called in pursuance of Section 122 of "The Division Courts Act."	Amount payable to County Treasurer for "Division Court Jury Fund."	The amount of Fees and Emoluments payable to the Honourable the Treasurer for the use of the Province.	Number of instances in which the Judge has allowed costs to be taxed for Counsel, Attorney or Agents' Fees under Section 16 of "The Division Courts Act," 1880.	The amount of costs so taxed.
			$ c.		$ c.		$ c.	$ c.	$ c.					$ c.		$ c.	$ c.		$ c.
Brought forward...	120	21552	853536 43	1703	89360 77	3475	298744 64	293387 84	11974 58	1928	93	38	90	776 00	5	868 16	1902 37	164	1042 00
LEEDS AND GRENVILLE.....	12	2217	72730 48	82	4664 64	352	31046 10	30553 52	2138 83	127	9	4	1	12 00	9	68 06	42 07	15	70 00
LENNOX AND ADDINGTON....	7	740	25992 47	31	1504 10	125	8103 31	8175 54	237 93	55	1	.....	2	20 00	1	25 51	.....	8	46 00
Carried forward...	139	24509	952259 38	1816	95529 51	3952	337894 05	332116 90	14351 34	2110	103	42	93	808 00	15	961 73	1944 44	187	1158 00

RETURN of Division Court Business.—*Continued.*

The Name of County, United Counties, or District.	Number of Divisions.	Number of suits entered, exclusive of Transcripts of Judgments and Judgment Summonses.	Amount of claims entered, exclusive of Transcripts of Judgments and Judgment Summonses.	Number of Transcripts of Judgments received from other Courts.	Amount of claims received by Transcripts of Judgments from other Courts.	Number of Judgment Summonses issued.	Total amount of Suitors' money paid into Court.	Total amount of Suitors' money paid out of Court.	Balance of Cash in Court.	Number of Suits entered, where the amount claimed exceeds $100.	Number of actions for Tort, where the amount claimed exceeds $40.	Number of actions of Replevin, where the value of the goods or other property or effects distrained, taken or detained, exceeds the sum of $40.	Number of Jury Trials by Juries summoned.	Amount paid to Jurors summoned.	Number of Jury Trials by Jurors, called in pursuance of Section 122 of "The Division Courts Act."	Amount payable to County Treasurer for "Division Court Jury Fund."	The amount of Fees and Emoluments payable to the Honourable the Treasurer for the use of the Province.	Number of instances in which the Judge has allowed costs to be taxed for Counsel, Attorney or Agents' Fees under Section 16 of "The Division Courts Act," 1880.	The amount of costs so taxed.
			$ c.		$ c.		$ c.	$ c.	$ c.					$ c.		$ c.	$ c.		$ c.
LINCOLN	1	79	2197 29	7	390 33	22	1112 01	1217 67	22 22	3	....	....	....	.....	....	1 80	.....	1	6 00
	2	377	14919 48	56	2376 64	108	5462 76	4859 02	603 74	31	2	1	....	.....	....	14 65	.....	8	48 00
	3	137	4750 89	20	747 72	13	1469 64	1498 31	8 74	8	1	....	....	.....	....	4 31	.....	.....	.....
	4	106	3336 22	23	1516 97	9	2756 19	2732 16	24 03	2	....	....	....	.....	....	2 42	.....	.....	.....
MANITOULIN	1	84	2577 29	16	1095 03	3	539 28	497 28	42 00	4	1	1	....	.....	....	.....	.....	.....	.....
	2	40	2855 77	13	519 79	2	1341 17	1341 17	.....	9	....	....	....	.....	....	.....	.....	.....	.....
	3	46	1769 75	12	364 81	3	435 12	400 12	35 00	4	1	....	....	.....	....	.....	.....	.....	.....
MIDDLESEX	1	1711	69122 38	47	2315 34	155	24611 03	25433 50	976 46	165	5	1	3	25 00	1	72 30	1283 20	26	156 00
	2	185	6938 46	13	858 69	8	2553 86	2504 31	118 74	18	2	....	....	.....	....	7 17	.....	2	17 00
	3	71	3477 55	7	389 85	1	1274 97	1237 39	37 58	10	3	....	1	10 00	....	4 03	.....	2	14 00
	4	75	3261 55	17	706 91	2	2061 73	2037 62	24 11	8	2	....	4	24 00	....	4 04	.....	.....	.....
	5	208	8919 46	34	1647 07	25	3083 98	2820 85	263 13	24	1	....	....	.....	....	9 63	.....	2	15 00
	6	187	8501 19	18	673 27	20	3014 25	2924 47	89 78	22	....	....	1	12 00	....	9 43	.....	.....	.....
	7	119	2603 83	11	....	22	1120 57	1027 36	190 19	2	....	....	3	36 00	1	1 85	.....	.....	.....
	8	47	1768 61	8	362 86	3	690 79	690 79	.....	2	....	1	2	24 00	....	1 28	.....	1	10 00
	9	154	2118 32	1	10 50	17	939 42	939 42	.....	....	.....	.....	.....	.....	....	1 42	.....	.....	.....

RETURN of Division Court Business—*Continued.*

THE NAME OF COUNTY, UNITED COUNTIES, OR DISTRICT.	Number of Divisions.	Number of suits entered, exclusive of Transcripts of Judgments and Judgment Summonses.	Amount of claims entered, exclusive of Transcripts of Judgments and Judgment Summonses.		Number of Transcripts of Judgments received from other Courts.	Amount of claims received by Transcripts of Judgments from other Courts.		Number of Judgment Summonses issued.	Total amount of Suitors' money paid into Court.		Total amount of Suitors' money paid out of Court.		Balance of Cash in Court.		Number of Suits entered, where the amount claimed exceeds $100.	Number of actions for Tort, where the amount claimed exceeds $40.	Number of actions of Replevin, where the value of the goods or other property or effects distrained, taken, or detained, exceeds the sum of $40.	Number of Jury Trials by Juries summoned.	Amount paid to Jurors summoned.		Number of Jury Trials by Jurors, called in pursuance of Section 122 of "The Division Courts Act."	Amount payable to County Treasurer for "Division Court Jury Fund."		The amount of Fees and Emoluments payable to the Honourable the Treasurer for the use of the Province.		Number of instances in which the Judge has allowed costs to be taxed for Counsel, Attorney or Agents' Fees under Section 16 of "The Division Courts Act," 1880.	The amount of costs so taxed.	
			$	c.		$	c.		$	c.	$	c.	$	c.					$	c.		$	c.	$	c.		$	c.
Brought forward . .	139	24569	952259	38	1816	95529	51	3952	337894	05	332116	90	14351	34	2110	103	42	93	808	00	15	961	73	1944	44	187	1158	00
LINCOLN	4	699	25203	88	106	5031	66	152	10800	60	10307	16	658	73	44	3	1	....	....	....	....	23	18	.....		9	54	00
MANITOULIN	3	170	7202	81	41	1979	63	8	2315	57	2238	57	77	00	17	2	1	....	.....		.....	.....		.....		.....			
MIDDLESEX	9	2757	106711	35	156	6914	49	253	39350	60	39615	71	1699	99	251	13	4	14	131	00	2	111	15	1283	20	33	212	00
Carried forward . . .	155	28135	1091377	42	2119	109455	29	4365	390360	82	384278	34	16787	06	2422	121	48	107	939	00	17	1096	06	3227	64	229	1424	00

RETURN of Division Court Business.—*Continued.*

The Name of County, United Counties, or District.	Number of Divisions.	Number of suits entered, exclusive of Transcripts of Judgments and Judgment Summonses.	Amount of claims entered, exclusive of Transcripts of Judgments and Judgment Summonses.	Number of Transcripts of Judgments received from other Courts.	Amount of Claims received by Transcripts of Judgments from other Courts.	Number of Judgment Summonses issued.	Total amount of Suitors' money paid into Court.	Total amount of Suitors' money paid out of Court.	Balance of Cash in Court.	Number of Suits entered, where the amount claimed exceeds $100.	Number of actions for Tort, where the amount claimed exceeds $40.	Number of actions of Replevin, where the value of the goods or other property or effects distrained, taken or detained, exceeds the sum of $40.	Number of Jury Trials by Juries summoned.	Amount paid to Jurors summoned.	Number of Jury Trials by Jurors, called in pursuance of Section 122 of "The Division Courts Act."	Amount payable to County Treasurer for "Division Court Jury Fund."	The amount of Fees and Emoluments payable to the Honourable the Treasurer for the use of the Province.	Number of instances in which the Judge has allowed Fees under Section 16 of "The Division Courts Act," 1880.	Amount of costs so taxed.
			$ c.		$ c.		$ c.	$ c.	$ c.					$ c.		$ c.	$ c.		$ c.
Muskoka	1	200	7263 63	20	1333 58	3	2047 30	2047 30	.....	10	1	.....	.....	.....	1	.....	.....	.....	10 00
	2	173	7081 09	26	1484 75	26	1527 83	1399 18	350 59	8	.....	.....	.....	.....	.....	.....	.....	2	.....
	3	95	5930 45	20	1233 17	7	777 18	768 16	9·02	7	.....	.....	.....	.....	1	.....	.....	.....	.....
	4	19	734 68	4	75 20	3	193 85	147 85	46 00	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Nipissing	1	54	1672 34	6	395 43	1	399 21	399 21	.....	.....	.....	.....	.....	.....	.....	.....	.....	1	2 00
	2	322	17684 80	12	430 27	16	3798 33	3765 18	33 15	40	1	.....	.....	.....	.....	.....	.....	.....	.....
	3	258	8709 75	22	1045 13	23	3148 40	3031 03	117 37	16	2	.....	.....	.....	.....	.....	.....	.....	.....
	4	90	2044 72	3	182 61	....	187 03	117 03	70 00	3	....	.....	.....	.....	.....	.....	.....	2	4 00
	5	200	5134 22	8	350 28	37	2496 91	2505 41	.....	6	.....	.....	2	24 00	3	4 53	.....	1	3 00
	6	200	4250 00	10	310 00	26	2295 00	1887 00	412 00	9	3	2	.....	.....	.....	48	.....	.....	.....
	7	29	680 10	18	732 65	8	288 44	275 35	13 09	.....	.....	.....	.....	.....	.....	1 13	.....	.....	.....
Norfolk	8	45	1410 98	6	336 96	3	599 32	599 32	.....	2	.....	.....	.....	.....	.....	.....	.....	.....	.....
	1	268	3913 13	9	628 95	54	3963 51	3819 76	143 75	17	2	.....	1	12 00	1	9 21	.....	1	8 00
	2	121	3451 80	13	443 98	32	1620 58	1560 48	60 20	7	1	.....	.....	.....	.....	3 43	.....	.....	.....
	3	61	1689 43	11	560 99	19	1098 11	1058 54	53 41	3	.....	.....	.....	.....	1	1 50	.....	.....	.....
	4	82	3368 63	32	1256 59	18	1650 72	1683 09	161 84	6	.....	.....	.....	.....	.....	3 09	.....	2	15 50
	5	200	5134 22	8	350 28	37	2496 91	2505 41	.....	6	.....	.....	2	24 00	3	4 32	.....	1	4 00
	6	200	4250 00	10	310 00	26	2295 00	1887 00	412 00	9	3	2	.....	.....	.....	4 53	.....	1	3 00
	7	29	680 10	18	732 65	8	288 44	275 35	13 09	.....	.....	.....	.....	.....	.....	48	.....	.....	.....
	8	45	1410 98	6	336 96	3	599 32	599 32	.....	2	.....	.....	.....	.....	.....	1 13	.....	.....	.....

RETURN of Division Court Business.—*Continued.*

THE NAME OF COUNTY, UNITED COUNTIES, OR DISTRICT.	Number of Divisions.	Number of suits entered, exclusive of Transcripts of Judgments and Judgment Summonses.	Amount of claims entered, exclusive of Transcripts of Judgments and Judgment Summonses.	Number of Transcripts of Judgments received from other Courts.	Amount of claims received by Transcripts of Judgments from other Courts.	Number of Judgment Summonses issued.	Total amount of Suitors' money paid into Court.	Total amount of Suitors' money paid out of Court.	Balance of Cash in Court.	Number of Suits entered, where the amount claimed exceeds $100.	Number of actions for Tort, where the amount claimed exceeds $40.	Number of actions of Replevin, where the value of the goods or other property or effects distrained, taken or detained, exceeds the sum of $40.	Number of Jury Trials by Jurors summoned.	Amount paid to Juries summoned.	Number of Jury Trials by Jurors, called in pursuance of Section 122 of "The Division Courts Act."	Amount payable to County Treasurer for "Division Court Jury Fund."	The amount of Fees and Emoluments payable to the Honourable the Treasurer for the use of the Province.	Number of instances in which the Judge has allowed fees to be taxed for Counsel, Attorney or Agents' under Section 16 of "The Division Courts Act," 1880.	The amount of costs so taxed.
			$ c.		$ c.		$ c.	$ c.	$ c.					$ c.		$ c.	$ c.		$ c.
Brought forward....	165	28135	1091377 42	2119	109455 29	4365	390360 82	382278 34	16787 06	2422	121	48	107	939 00	17	1096 06	3227 64	229	1424 00
MUSKOKA	4	487	21009 85	70	4125 70	39	4546 16	4362 49	405 61	25	1	.....	.....	.....	2	.....	.....	2	10 00
NIPISSING	4	724	29511 61	43	2053 44	40	7532 97	7312 45	220 52	59	3	1	.....	.....	.....	.....	.....	3	6 00
NORFOLK.....	8	1006	29424 29	107	4620 40	197	14016 59	13388 95	844 29	50	6	4	3	36 00	5	27 69	.....	5	30 50
Carried forward....	171	30352	1171323 17	2339	120255 83	4641	416456 54	409342 23	18257 48	2556	131	53	110	975 00	24	1123 75	3227 64	239	1470 50

Return of Division Court Business.—*Continued.*

The Name of County, United Counties, or District.	Number of Divisions.	Number of suits entered, exclusive of Transcripts of Judgments and Judgment Summonses.	Amount of claims entered, exclusive of Transcripts of Judgments and Judgment Summonses.	Number of Transcripts of Judgments received from other Courts.	Amount of claims received by Transcripts of Judgments from other Courts.	Number of Judgment Summonses issued.	Total amount of Suitors' money paid into Court.	Total amount of Suitors' money paid out of Court.	Balance of Cash in Court.	Number of Suits entered, where the amount claimed exceeds $100.	Number of actions for Tort, where the amount claimed exceeds $40.	Number of actions of Replevin, where the value of the goods or other property or effects distrained, taken or detained, exceeds the sum of $40.	Number of Jury Trials by Juries summoned.	Amount paid to Jurors summoned.	Number of Jury Trials by Jurors, called in pursuance of Section 122 of "The Division Courts Act."	Amount payable to County Treasurer for "Division Court Jury Fund."	The amount of Fees and Emoluments payable to the Honourable the Treasurer for the use of the Province.	Number of instances in which the Judge has allowed costs to be taxed for Counsel, Attorney or Agents' Fees under Section 16 of "The Division Courts Act," 1880.	The amount of costs so taxed.
			$ c.		$ c.		$ c.	$ c.	$ c.					$ c.		$ c.	$ c.		$ c.
Northumberland and Durham ...	1	224	9437 37	10	1099 79	28	2083 30	2072 76	100 83	24	2	.....	6	40 00	.....	8 82	.....	.....	.....
	2	103	4026 75	7	69 65	26	1463 59	1334 66	128 93	6	.....	.....	.....	.....	.....	3 39	.....	.....	.....
	3	197	8972 17	15	1018 74	13	3462 97	4979 14	53 98	15	.....	.....	.....	.....	.....	8 01	.....	1	3 00
	4	198	6508 21	30	1329 94	68	1963 40	1942 22	288 41	10	.....	.....	.....	.....	.....	5 65	.....	.....	.....
	5	291	13413 40	9	434 09	64	1920 79	1845 24	93 16	31	.....	.....	3	16 00	1	13 78	.....	8	37 50
	6	50	1655 77	10	548 63	15	760 72	763 57	38 15	3	.....	.....	2	27 00	1	1 59	.....	1	5 00
	7	149	8189 53	16	866 96	35	1420 16	1317 17	120 18	24	.....	.....	2	12 00	.....	9 00	.....	3	20 00
	8	130	8141 11	10	751 75	37	1728 33	1728 33	.....	29	1	.....	5	64 00	3	9 50	.....	8	60 00
	9	217	6359 60	7	369 32	37	2055 71	1817 38	238 33	11	.....	.....	2	19 00	.....	5 90	.....	.....	.....
	10	134	4011 32	18	1113 81	34	3124 93	3109 68	15 25	9	2	.....	2	40 00	.....	4 02	.....	2	20 40
	11	192	8392 97	11	353 42	22	2808 46	2733 62	264 33	26	.....	2	2	11 00	.....	9 77	.....	5	40 00
Ontario	1	338	14182 00	32	1560 00	40	3908 93	3892 48	16 45	21	3	2	1	11 00	.....	14 25	.....	7	35 00
	2	130	4948 10	11	749 93	36	2974 56	2974 56	.....	7	1	1	...	.....	.....	4 45	.....	...	.....
	3	199	7394 30	15	978 18	21	1858 61	1791 68	66 93	18	2	1	...	.....	.....	7 74	.....	5	25 00
	4	715	32658 35	26	1203 01	114	5372 58	5323 88	115 63	90	3	1	....	.....	.....	23 07	...	2	15 00
	5	166	9050 73	9	575 31	8	4678 58	4479 70	198 88	28	1	1	....	.....	.....	10 18	.....	1	5 00
	6	67	3201 27	7	341 52	2	955 90	873 90	84 00	5	....	1	....	.....	.....	3 14	.....	1	10 00
	7	67	4174 39	19	1159 73	15	1366 07	1281 99	84 08	7	....	1	1	11 00	....	3 25	.....	.....	.....

RETURN of Division Court Business.—*Continued.*

THE NAME OF COUNTY, UNITED COUNTIES, OR DISTRICT.	Number of Divisions.	Number of suits entered, exclusive of Transcripts of Judgments and Judgment Summonses.	Amount of claims entered, exclusive of Transcripts of Judgments and Judgment Summonses.	Number of Transcripts of Judgments received from other Courts.	Amount of Claims received by Transcripts of Judgments from other Courts.	Number of Judgment Summonses issued.	Total amount of Suitors' money paid into Court.	Total amount of Suitors' money paid out of Court.	Balance of Cash in Court.	Number of Suits entered, where the amount claimed exceeds $100.	Number of actions for Tort, where the amount claimed exceeds $40.	Number of actions of Replevin, where the value of the goods or other property or effects distrained, taken or detained, exceeds the sum of $40.	Number of Jury Trials by Juries summoned.	Amount paid to Jurors summoned.	Number of Jury Trials by Jurors, called in pursuance of Section 122 of "The Division Courts Act."	Amount payable to County Treasurer for "Division Court Jury Fund."	The amount of Fees and Emoluments payable to the Honourable the Treasurer for the use of the Province.	Number of instances in which the Judge has allowed costs to be taxed for Counsel, Attorney or Agents' Fees under Section 16 of "The Division Courts Act," 1880.	The amount of costs so taxed.
			$ c.		$ c.		$ c.	$ c.	$ c.					$ c.		$ c.	$ c.		$ c.
Brought forward...	171	30352	1171323 17	2339	120255 83	4841	416456 54	409342 23	18257 48	2556	131	53	110	975 00	24	1123 75	3227 64	239	1470 50
NORTHUMBERLAND AND DURHAM ...	11	1885	79108 20	143	7955 10	379	22852 36	23643 77	1350 55	188	6	2	31	229 00	5	79 43	.....	28	185 50
ONTARIO	7	1682	75609 14	119	6567 68	236	21115 23	20718 19	565 97	176	10	8	2	22 00	....	66 08	.....	16	90 00
Carried forward....	189	33919	1326040 51	2601	134778 61	5256	460424 13	453704 19	20174 00	2920	147	63	143	1226 00	29	1259 26	3227 64	283	1746 00

RETURN of Division Court Business.—*Continued.*

The Name of County, United Counties, or District.	Number of Divisions.	Number of suits entered, exclusive of Transcripts of Judgments and Judgment Summonses.	Amount of claims entered, exclusive of Transcripts of Judgments and Judgment Summonses.	Number of Transcripts of Judgments received from other Courts.	Amount of claims received by Transcripts of Judgments from other Courts.	Number of Judgment Summons issued.	Total amount of Suitors' money paid into Court.	Total amount of Suitors' money paid out of Court.	Balance of Cash in Court.	Number of Suits entered, where the amount claimed exceeds $100.	Number of actions for Tort, where the amount claimed exceeds $40.	Number of actions of Replevin, where the value of the goods or other property or effects distrained, taken or detained, exceeds the sum of $40.	Number of Jury Trials by Juries summoned.	Amount paid to Jurors summoned.	Number of Jury Trials by Jurors, called in pursuance of Section 122 of "The Division Courts Acts."	Amount payable to County Treasurer for "Division Court Jury Fund."	The amount of Fees and Emoluments payable to the Honourable the Treasurer for the use of the Province.	Number of instances in which the Judge has allowed Fees under Section 16 of "The Division Courts Act," 1880.	The amount of costs so taxed.
			$ c.		$ c.		$ c.	$ c.	$ c.					$ c.		$ c.	$ c.		$ c.
OXFORD	1	1168	47265 67	38	2093 95	212	16262 69	16522 78	1275 49	102	1	.....	5	45 00	1	42 99	465 72	8	46 00
	2	96	3311 82	14	1050 44	6	1536 28	1592 63	4 37	5	1	.....	.....	.....	1	3 08	.....	.....	.....
	3	161	5825 63	18	934 48	12	1911 41	1890 12	21 39	20	1	.....	1	12 00	3	6 59	.....	1	5 00
	4	210	6950 85	17	966 89	63	2232 35	2191 55	40 80	13	.....	.....	.....	.....	3	9 43	.....	4	17 00
	5	464	16893 44	22	1224 93	34	6521 88	6324 47	197 41	39	.....	.....	1	10 00	1	18 54	.....	2	10 00
	6	307	12128 74	16	1251 83	72	4545 98	4620 97	39 06	27	2	.....	.....	.....	3	12 96	.....	1	5 00
PARRY SOUND	1	86	3535 57	17	1146 83	22	1589 04	1523 29	66 75	7	2	.....	.....	.....	.....	.....	.....	.....	.....
	2	66	3722 71	17	805 16	6	1304 19	1304 19	8 00	11	.....	.....	.....	.....	.....	.....	.....	.....	.....
	3	11	325 62	2	42 50	.....	130 41	130 41	.....	1	.....	.....	.....	.....	.....	.....	.....	.....	.....
	4	104	2743 97	12	482 81	1	1697 87	1407 47	130 40	4	.....	.....	.....	.....	.....	.....	.....	.....	.....
	5	76	2068 31	16	264 55	7	506 43	443 30	63 13	2	.....	1	.....	.....	.....	.....	.....	.....	.....
	6	49	2364 54	33	2168 73	4	1390 15	1377 44	57 56	5	.....	.....	.....	.....	.....	.....	.....	.....	.....
	7	123	5783 49	22	1450 78	1	1293 05	1045 05	248 00	13	1	.....	.....	.....	.....	.....	.....	.....	.....
PEEL	1	323	19201 74	29	2298 92	91	6698 20	6933 28	73 14	50	.....	.....	7	52 00	1	18 20	.....	10	52 00
	2	130	5706 00	20	1393 56	11	2165 44	2085 44	80 00	13	.....	.....	.....	.....	.....	6 04	.....	3	18 00
	3	84	3591 05	26	1713 90	19	1713 56	1641 91	71 65	8	2	.....	.....	.....	.....	3 80	.....	.....	.....
	4	53	2766 29	14	261 71	7	1517 88	1513 70	.....	10	.....	.....	.....	.....	.....	4 03	.....	.....	.....

RETURN of Division Court Business—*Continued.*

THE NAME OF COUNTY, UNITED COUNTIES, OR DISTRICT.	Number of Divisions.	Number of suits entered, exclusive of Transcripts of Judgments and Judgment Summonses.	Amount of claims entered, exclusive of Transcripts of Judgments and Judgment Summonses.	Number of Transcripts of Judgments received from other Courts.	Amount of claims received by Transcripts of Judgments from other Courts.	Number of Judgment Summonses issued.	Total amount of Suitors' money paid into Court.	Total amount of Suitors' money paid out of Court.	Balance of Cash in Court.	Number of Suits entered, where the amount claimed exceeds $100.	Number of actions for Tort, where the amount claimed exceeds $40.	Number of actions of Replevin, where the value of the goods or other property or effects distrained, taken or detained, exceeds the sum of $40.	Number of Jury Trials by Juries summoned.	Amount paid to Jurors summoned.	Number of Jury Trials by Jurors, called in pursuance of Section 122 of "The Division Courts Act."	Amount payable to County Treasurer for "Division Court Jury Fund."	The amount of Fees and Emoluments payable to the Honourable the Treasurer for the use of the Province.	Number of instances in which the Judge has allowed costs to be taxed for Counsel, Attorney or Agents' Fees under Section 16 of "The Division Courts Act," 1880.	The amount of costs so taxed.
			$ c.		$ c.		$ c.	$ c.	$ c.					$ c.		$ c.	$ c.		$ c.
Brought forward.	189	33919	1320040 51	2601	134778 61	5256	460424 13	453704 19	20174 00	2920	147	63	143	1226 00	29	1269 26	3227 61	283	1746 00
OXFORD	6	2406	92376 15	125	7542 52	399	33010 59	33142 52	1578 52	206	5	.....	7	67 00	12	93 59	465 72	16	83 00
PARRY SOUND	7	515	20544 21	119	6361 35	41	7811 14	7291 15	573 84	43	3	1	.....	.....	.....	.....	.....	.....	.....
PEEL.....	4	590	31265 08	89	5668 09	128	12095 08	12174 33	224 79	81	2	.....	7	52 00	1	32 07	.....	13	70 00
Carried forward..	206	37430	1470225 95	2934	154350 57	5824	513340 94	506312 19	22551 15	3250	157	64	157	1345 00	42	1394 92	3693 36	312	1899 00

RETURN of Division Court Business.—*Continued.*

THE NAME OF COUNTY, UNITED COUNTIES, OR DISTRICT.		Number of Divisions.	Number of suits entered, exclusive of Transcripts of Judgments and Judgment Summonses.	Amount of claims entered, exclusive of Transcripts of Judgments and Judgment Summonses.	Number of Transcripts of Judgments received from other Courts.	Amount of claims received by Transcripts of Judgments from other Courts.	Number of Judgment Summonses issued.	Total amount of Suitors' money paid into Court.	Total amount of Suitors' money paid out of Court.	Balance of Cash in Court.	Number of Suits entered, where the amount claimed exceeds $100.	Number of actions for Tort, where the amount claimed exceeds $40.	Number of actions of Replevin, where the value of the goods or other property or effects distrained, taken or detained, exceeds the sum of $40.	Number of Jury Trials by Juries summoned.	Amount paid to Jurors summoned.	Number of Jury Trials by Jurors, called in pursuance of Section 122 of "The Division Courts Act."	Amounts payable to County Treasurer for Division Court Jury Fund."	The amount of Fees and Emoluments payable to the Honourable the Treasurer for the use of the Province.	Number of instances in which the Judge has allowed costs to be taxed for Counsel, Attorney or Agents' Fees under Section 16 of "The Division Courts Act," 1880.	The amount of costs so taxed.
				$ c.		$ c.		$ c.	$ c.	$ c.					$ c.		$ c.	$ c.		$ c.
PERTH	1	1	429	15696 10	42	2017 97	49	6820 74	6673 87	146 87	43	1	...	...	....	....	17 32	11 34	8	45 00
	2	2	174	7246 01	8	386 52	12	2739 71	2688 00	65 43	19	1	1	1	12 00	....	7 96	.....	2	10 00
	3	3	259	9148 84	12	428 61	41	3236 86	3236 86	.....	20	1	.....	1	11 00	....	8 30	.....	.....	.....
	4	4	83	2971 00	3	155 40	5	876 51	871 51	5 00	9	...	.....	1	12 00	....	3 87	.....	.....	.....
	5	5	67	2543 28	4	155 20	2	966 33	966 33	.....	4	1	.....	....	.....	....	2 41	.....	.....	.....
	6	6	280	8265 60	24	1110 81	33	3401 30	3486 31	96 58	13	4	2	....	.....	....	7 51	.....	2	10 00
PETERBOROUGH	1	1	745	29279 29	22	1155 53	97	8310 82	8310 82	.....	55	5	.....	1	9 00	....	27 13	112 06	3	15 00
	2	2	114	4795 35	17	984 70	13	2354 54	2181 48	169 06	10	2	.....	....	.....	....	4 93	.....	1	5 00
	3	3	17	440 63	3	54 17	...	157 10	142 83	22 02	1	...	.....	....	.....	....	37	.....	.....	.....
	4	4	115	5340 76	5	388 88	17	2044 81	2034 81	10 00	12	1	.....	1	12 00	....	5 58	.....	.....	.....
	5	5	30	920 42	3	340 74	....	196 28	191 28	5 00	1	....	.....	....	.....	....	76	.....	.....	.....

RETURN of Division Court Business.—*Continued.*

THE NAME OF COUNTY, UNITED COUNTIES, OR DISTRICT.	Number of Divisions.	Number of suits entered, exclusive of Transcripts of Judgments and Judgment Summonses.	Amount of claims entered, exclusive of Transcripts of Judgments received from other Courts.	Number of Transcripts of Judgments received from other Courts.	Amount of claims received by Transcripts of Judgments from other Courts.	Number of Judgment Summonses issued.	Total amount of Suitors' money paid into Court.	Total amount of Suitors' money paid out of Court.	Balance of Cash in Court.	Number of Suits entered, where the amount claimed exceeds $100.	Number of actions for Tort, where the amount claimed exceeds $40.	Number of actions of Replevin, where the value of the goods or other property or effects distrained, taken or detained, exceeds the sum of $40.	Number of Jury Trials by Juries summoned.	Amount paid to Jurors summoned.	Number of Jury Trials by Jurors, called in pursuance of Section 122 of "The Division Court's Act."	Amount payable to County Treasurer for "Division Court Jury Fund."	The amount of Fees and Emoluments payable to the Honourable the Treasurer for the use of the Province.	Number of instances in which the Judge has allowed costs to be taxed for Counsel, Attorney or Agents' Fees under Section 16 of "The Division Courts Act," 1880.	The amount of costs so taxed.
			$ c.		$ c.		$ c.	$ c.	$ c.					$ c.		$ c.	$ c.		$ c.
Brought forward.	206	37480	1470225 95	2934	154350 57	5824	513340 94	506312 19	22551 15	3250	157	64		1345 00	42	1394 92	3693 36	4	1899 00
PERTH	6	1292	45870 83	93	4254 51	142	18041 45	17922 88	313 88	108	8	3	3	35 00	....	47 37	11 34	12	65 00
PETERBOROUGH ..	5	1021	40776 45	50	2924 02	127	13059 55	12861 22	206 08	79	8	.....	2	21 00	....	38 77	112 06	4	20 00
Carried forward..	217	39743	1556873 23	3077	161529 10	6093	544441 94	537096 29	23071 11	3437	173	67	162	1401 00	42	1481 06	3816 76	328	1984 00

RETURN of Division Court Business.—*Continued.*

THE NAME OF COUNTY, UNITED COUNTIES, OR DISTRICT.	Number of Divisions.	Number of suits entered, exclusive of Transcripts of Judgments and Judgment Summonses.	Amount of claims entered, exclusive of Transcripts of Judgments and Judgment Summonses.	Number of Transcripts of Judgments received from other Courts.	Amount of Claims received by Transcripts of Judgments from other Courts.	Number of Judgment Summonses issued.	Total amount of Suitors' money paid into Court.	Total amount of Suitors' money paid out of Court.	Balance of Cash in Court.	Number of Suits entered, where the amount claimed exceeds $100.	Number of actions for Tort, where the amount claimed exceeds $40.	Number of actions of Replevin, where the value of the goods or other property or effects distrained, taken or detained, exceeds the sum of $40.	Number of Jury Trials by Juries summoned.	Amount paid to Jurors summoned.	Number of Jury Trials by Jurors called in pursuance of Section 122 of "The Division Courts Act."	Amount payable to County Treasurer for "Division Court Jury Fund."	The amount of Fees and Emoluments payable to the Honourable the Treasurer for the use of the Province.	Number of instances in which the Judge has allowed costs to be taxed for Counsel, Attorney or Agents' Fees under Section 16 of "The Division Courts Act," 1880.	The amount of costs so taxed.
			$ c.		$ c.		$ c.	$ c.	$ c.					$ c.		$ c.	$ c.		$ c.
PRESCOTT AND RUSSELL	1	71	3030 10	3	67 45	7	966 02	933 76	32 26	6	15	.....	.....	23 00	.....	2 49	.....	.....	.....
	2	87	2801 06	3	268 74	1	1864 64	1864 64	.....	3	1	.....	2	.....	.....	2 28	.....	.....	.....
	3	87	3380 07	.....	.....	.....	1447 27	1447 27	.....	8	.....	.....	.....	.....	.....	3 53	.....	1	10 00
	4	141	4336 19	9	321 82	43	1706 30	1697 69	70 39	8	.....	.....	.....	.....	.....	4 22	.....	.....	.....
	5	88	3566 92	9	184 68	5	968 66	960 15	6 51	5	.....	.....	.....	.....	.....	1 88	.....	1	10 00
	6	83	2537 24	16	1009 68	1	1505 59	1495 76	9 83	3	.....	1	.....	.....	.....	2 19	.....	.....	.....
	7	69	2056 35	2	100 86	23	1036 59	1036 08	.....	3	.....	.....	.....	.....	.....	1 86	.....	.....	.....
	8	113	3830 73	6	200 90	12	1402 25	1392 83	63 24	5	.....	1	1	15 00	.....	3 41	.....	.....	.....
	9	157	5455 62	.....	.....	12	1843 44	1822 44	21 00	7	1	.....	.....	.....	.....	4 72	.....	1	2 00
	10	93	2289 99	4	98 60	3	1094 34	1092 91	1 43	1	.....	.....	.....	.....	.....	1 63	.....	.....	.....
	11	153	6421 89	15	932 91	19	2699 48	2365 45	334 03	10	1	.....	.....	.....	.....	5 86	.....	1	10 00
PRINCE EDWARD ..	1	245	11876 33	9	699 40	21	3325 34	2897 13	428 21	35	5	.....	2	30 00	2	14 45	.....	3	12 00
	2	80	3673 87	.....	.....	2	1398 02	1398 02	.....	10	.....	.....	.....	12 00	.....	4 24	.....	.....	.....
	3	22	845 84	4	279 48	.....	381 43	381 43	.....	1	.....	.....	.....	.....	.....	76	.....	1	10 00
	4	18	558 50	4	909 87	2	407 18	.....	1	1	1	.....	.....	.....	.....	55	.....	.....	.....
	5	27	1099 64	3	79 27	.....	271 80	271 80	.....	4	.....	.....	1	12 00	.....	1 48	.....	3	23 00
	6	50	1985 48	.....	.....	10	427 59	427 59	.....	6	.....	.....	.....	.....	.....	2 13	.....	.....	.....
	7	33	1263 62	4	101 55	2	234 38	234 38	.....	.....	.....	.....	.....	.....	.....	96	.....	.....	.....
	8	14	574 38	1	51 54	.....	89 35	89 35	.....	2	.....	.....	1	12 00	.....	74	.....	.....	.....

RETURN of Division Court Business.—*Continued.*

THE NAME OF COUNTY, UNITED COUNTIES, OR DISTRICT.	Number of Divisions.	Number of suits entered, exclusive of Transcripts of Judgments and Judgment Summonses.	Amount of claims entered, exclusive of Transcripts of Judgments and Judgment Summonses.	Number of Transcripts of Judgments received from other Courts.	Number of claims received by Transcripts of Judgments from other Courts.	Number of Judgment Summonses issued.	Total amount of Suitors' money paid into Court.	Total amount of Suitors' money paid out of Court.	Balance of Cash in Court.	Number of Suits entered, where the amount claimed exceeds $100.	Number of actions for Tort, where the amount claimed exceeds $40.	Number of actions for Replevin, where the value of the goods or other property or effects distrained, taken or detained, exceeds the sum of $40.	Number of Jury Trials by Juries summoned.	Amount paid to Jurors summoned.	Number of Jury Trials by Jurors, called in pursuance of Section 122 of "The Division Courts Act."	Amount payable to County Treasurer for "Division Court Jury Fund."	The amount of Fees and Emoluments payable to the Honourable the Treasurer for the use of the Province.	Number of instances in which the Judge has allowed costs to be taxed for Counsel, Attorney or Agents' Fees under Section 16 of "The Division Courts Act," 1880.	The amount of costs so taxed.
							$ c.	$ c.	$ c.					$ c.		$ c.	$ c.		$ c.
Brought forward....	217	39743	1556873 23	3077	161629 10	6093	544441 94	537096 29	23071 11	3437	173	67	162	1401 00	42	1481 06	3816 76	328	1984 00
PRESCOTT AND RUSSELL	11	1142	39706 16	67	3185 64	126	16532 07	16108 98	638 69	59	18	2	3	38 00	....	34 07	.....	4	32 00
PRINCE EDWARD ..	8	489	21877 66	25	1421 11	37	6535 09	6106 88	428 21	59	6	1	5	66 00	2	25 31	....	7	45 00
Carried forward ...	236	41374	1618457 05	3169	166135 85	6256	567509 10	559312 15	24038 01	3555	197	70	170	1505 00	44	1540 41	3816 76	339	2061 00

RETURN of Division Court Business.—*Continued.*

The Name of County, United Counties, or District.		Number of Divisions.	Number of suits entered, exclusive of Transcripts of Judgments and Judgment Summonses.	Amount of claims entered, exclusive of Transcripts of Judgments and Judgment Summonses.	Number of Transcripts of Judgments received from other Courts.	Amount of claims received by Transcripts of Judgments from other Courts.	Number of Judgment Summonses issued.	Total amount of Suitors' money paid into Court.	Total amount of Suitors' money paid out of Court.	Balance of Cash in Court.	Number of Suits entered, where the amount claimed exceeds $100.	Number of actions for Tort, where the amount claimed exceeds $40.	Number of actions of Replevin, where the value of the goods or other property or effects distrained, taken or detained, exceeds the sum of $40.	Number of Jury Trials by Juries summoned.	Amount paid to Jurors summoned.	Number of Jury Trials by Jurors, called in pursuance of Section 122 of "The Division Courts Act."	Amount payable to County Treasurer for "Division Court Jury Fund."	The amount of Fees and Emoluments payable to the Honourable the Treasurer for the use of the Province.	Number of instances in which the Judge has allowed costs to be taxed for Counsel, Attorney or Agents' Fees under Section 16 of "The Division Courts Acts," 1880.	The amount of costs so taxed.
				$ c.		$ c.		$ c.	$ c.	$ c.					$ c.		$ c.	$ c.		$ c.
RAINY RIVER.....	1	1	135	5600 42	3	430 12	8	1800 90	1625 28	175 62	6	1				1				
	2	2	1	99 00	....	.....	....	10 63	10 63	.....	....	....	....	....	.....	....	.....	.....	....	.....
RENFREW	1	1	370	14447 14	5	222 78	51	3712 15	3576 48	284 63	33	....	....	1	10 50	....	14 85	.....	3	20 00
	2	2	43	1513 82	1	94 50	2	909 77	781 21	135 77	2	....	....	1	12 50	....	1 49	.....	....	.....
	3	3	238	9556 29	9	515 19	13	2864 09	2918 73	21 94	18	....	....	2	12 00	....	8 92	.....	1	10 00
	4	4	208	8360 97	20	939 02	19	3276 09	3242 04	34 05	20	....	....	....	.....	....	8 48	.....	3	10 00
	5	5	57	2978 57	4	257 62	3	799 69	787 64	12 05	10	....	....	....	.....	....	3 55	.....	....	.....
	6	6	161	5453 53	4	163 25	11	1740 14	1740 14	.....	9	2	....	....	.....	....	4 77	.....	....	.....
	7	7	83	2514 48	4	206 19	4	999 32	918 31	81 01	4	....	....	....	.....	....	2 26	.....	....	.....
	8	8	66	2720 04	7	318 10	2	635 03	600 54	34 49	5	1	....	....	.....	....	2 48	.....	3	25 00
SIMCOE	1	1	455	21728 34	35	1936 38	109	5082 95	4878 43	602 97	60	3	....	....	.....	....	24 45	20 00	5	25 00
	2	2	137	6263 28	12	813 65	9	3931 09	3849 12	81 97	25	1	....	1	.....	....	8 35	.....	....	.....
	3	3	216	9923 60	28	1624 82	45	4112 10	4075 00	37 00	24	1	1	1	12 00	....	10 59	.....	1	2 00
	4	4	344	12652 89	29	1411 97	68	4320 14	4195 74	124 40	25	2	....	....	.....	....	13 06	.....	....	.....
	5	5	220	9214 49	21	1525 79	28	3420 55	3407 48	13 08	24	1	....	3	.....	....	11 04	.....	....	.....
	6	6	507	16289 55	48	2903 39	130	7298 06	7198 72	411 91	29	3	1	1	12 00	....	17 33	34 16	....	.....
	7	7	108	4292 43	23	1114 54	12	2302 96	1811 71	491 25	13	....	....	....	.....	....	5 62	.....	....	.....
	8	8	203	9114 83	23	1585 17	42	4167 64	4095 75	71 89	18	3	....	2	24 00	....	8 49	.....	2	10 00
	9	9	217	8693 50	27	1224 50	44	1844 93	1641 40	203 53	16	2	....	1	7 00	....	8 20	.....	1	10 00
	10	10	89	1536 49	7	399 77	14	1422 82	1349 82	73 00	4	....	....	....	.....	....	2 83	.....	....	.....

RETURN of Division Court Business.—*Continued*

THE NAME OF COUNTY, UNITED COUNTIES, OR DISTRICT.	Number of Divisions.	Number of suits entered, exclusive of Transcripts of Judgments and Judgment Summonses.	Amount of claims entered, exclusive of Transcripts of Judgments and Judgment Summonses.	Number of Transcripts of Judgments received from other Courts	Amount of Claims received by Transcripts of Judgments from other Courts.	Number of Judgment Summonses issued.	Total amount of Suitors' money paid into Court.	Total amount of Suitors money paid out of Court.	Balance of Cash in Court.	Number of Suits entered, where the amount claimed exceeds $100.	Number of actions for Tort, where the amount claimed exceeds $40.	Number of actions of Replevin, where the value of the goods or other property or effects distrained, taken or detained, exceeds the sum of $40.	Number of Jury Trials by Juries summoned.	Amount paid to Jurors summoned.	Number of Jury Trials by Jurors, called in pursuance of Section 122 of "The Division Courts Act."	Amount payable to County Treasurer for "Division Court Jury Fund."	The amount of Fees and Emoluments payable to the Honourable the Treasurer for the use of the Province.	Number of instances in which the Judge has allowed costs to be taxed for Counsel, Attorney or Agents' Fees under Section 16 of "The Division Courts Act," 1880.	The amount of costs so taxed.
			$ c.		$ c.		$ c.	$ c.	$ c.					$ c.		$ c.	$ c.		$ c.
Brought forward....	236	4137	1618457 05	3169	166135 85	6256	567509 10	559312 15	24038 01	3555	197	70	170	1505 00	44	1540 44	3816 76	339	2061 00
RAINY RIVER	3	136	5699 42	3	430 12	8	1811 53	1675 91	175 62	6	1	.....	....	.....	1	.....	.....	3	47 21
RENFREW	8	1225	47544 84	54	2716 65	104	14936 28	14565 09	603 94	101	3	....	4	35 00	....	46 80	.....	10	65 00
SIMCOE	10	2496	99709 40	253	14539 98	501	37903 25	36503 17	2111 00	238	16	8	5	55 00	....	109 96	54 16	9	47 00
Carried forward....	257	4523	1771410 71	3479	183822 60	6869	622160 16	612016 32	26928 57	3900	217	78	179	1595 00	45	1697 20	3870 92	361	2220 21

RETURN of Division Court Business.—*Continued.*

The Name of County, United Counties, or District.		Number of Divisions.	Number of suits entered, exclusive of Transcripts of Judgments and Judgment Summonses.	Amount of claims entered, exclusive of Transcripts of Judgments and Judgment Summonses.	Number of Transcripts of Judgments received from other Courts.	Amount of Claims received by Transcripts of Judgments from other Courts.	Number of Judgment Summonses issued.	Total amount of Suitors' money paid into Court.	Total amount of Suitors' money paid out of Court.	Balance of Cash in Court.	Number of Suits entered, where the amount claimed exceeds $100.	Number of actions for Tort, where the amount claimed exceeds $40.	Number of actions of Replevin, where the value of the goods or other property or effects distrained, taken or detained, exceeds the sum of $40.	Number of Jury Trials by Juries summoned.	Amount paid to Jurors summoned.	Number of Jury Trials by Juror, called in pursuance of Section 122 of "The Division Courts Act."	Amount payable to County Treasurer for "Division Court Jury Fund."	The amount of Fees and Emoluments payable to the Honourable the Treasurer for the use of the Province.	Number of instances in which the Judge has allowed Fees under Section 16 of "The Division Courts Act," 1880.	Amount of costs so taxed.
				$ c.		$ c.		$ c.	$ c.	$ c.					$ c.		$ c.	$ c.		$ c.
STORMONT, DUNDAS AND GLENGARRY.	1	1	272	9433 07	17	665 27	27	4324 80	3954 54	370 26	22						10 39			3 00
	2	2	232	8911 41	9	393 64	30	2776 00	2887 53	58 30	22		1				9 43		1	
	3	3	618	18179 99	13	548 91	132	6606 52	6603 26	53 26	50		1				23 15	55 70	3	11 00
	4	4	248	6710 36	11	710 41	38	5989 83	6126 78	70 93	14		1				7 64			
	5	5	286	11271 00	6	225 62	6	3568 83	3568 83		26	1	1				10 55			
	6	6	170	5225 69	12	372 55	55	1357 11	1302 61	54 50	10	1	2				4 90			
	7	7	120	3132 35	5	299 02	6	1539 97	1534 48	4 52	4						3 19			
	8	8	234	9339 34	14	963 04	15	4019 57	3997 37	169 88	15		1				8 40			
	9	9	135	5405 88	5	199 23	6	1867 74	1858 93	8 81	13						5 71		1	2 00
	10	10	250	8641 50	13	533 59	24	2326 52	2307 40	19 12	14	2					7 70		1	5 00
	11	11	151	3592 17	16	914 19	11	1805 66	1742 12	64 54	7						4 57			
	12	12	213	6396 13	4	187 28	38	1591 20	1536 23	54 97	21		2				8 73			
THUNDER BAY	1	1	107	6201 75	6	605 94	9	458 24	443 24	15 00	12		1							
	2	2																		
	3	3	85	2708 46	2	49 14	2	1426 85	1350 85	76 00	1									

RETURN of Division Court Business—*Continued.*

THE NAME OF COUNTY, UNITED COUNTIES, OR DISTRICT.	Number of Divisions.	Number of suits entered, exclusive of Transcripts of Judgments and Judgment Summonses.	Amount of claims entered, exclusive of Transcripts of Judgments and Judgment Summonses.	Number of Transcripts of Judgments received from other Courts.	Amount of claims received by Transcripts of Judgments from other Courts.	Number of Judgment Summonses issued.	Total amount of Suitors' money paid into Court.	Total amount of Suitors' money paid out of Court.	Balance of Cash in Court.	Number of Suits entered, where the amount claimed exceeds $100.	Number of actions for Tort, where the amount claimed exceeds $40.	Number of actions of Replevin, where the value of the goods or other property or effects distrained, taken or detained, exceeds the sum of $40.	Number of Jury Trials by Juries summoned.	Amount paid to Jurors summoned.	Number of Jury Trials by Jurors, called in pursuance of Section 122 of "The Division Courts Act."	Amount payable to County Treasurer for "Division Court Jury Fund."	The amount of Fees and Emoluments payable to the Honourable the Treasurer for the use of the Province.	Number of instances in which the Judge has allowed costs to be taxed for Counsel, Attorney or Agents' Fees under Section 16 of "The Division Courts Act," 1880.	The amount of costs so taxed.
			$ c.		$ c.		$ c.	$ c.	$ c.					$ c.		$ c.	$ c.		$ c.
Brought forward.	257	45231	1771410 71	3479	183822 60	6869	622160 16	612016 32	26928 57	3900	217	78	179	1595 00	45	1697 20	3870 92	361	2220 21
STORMONT, DUNDAS AND GLENGARRY.	12	2929	96248 89	125	6012 75	388	37774 75	37420 08	929 09	218	4	9	.....	.....	....	104 36	55 70	6	21 00
THUNDER BAY.....	3	192	8910 21	8	635 08	11	1885 09	1794 09	91 00	13	....	1	.....	.....	....	.....	.....	.....	.....
Carried forward.	272	4385	1876569 81	3612	190470 43	7268	661820 00	651230 49	27948 66	4131	221	78	179	1595 00	45	1801 56	3926 62	367	2241 21

Return of Division Court Business.—*Continued.*

The Name of County, United Counties, or District.	Number of Divisions.	Number of suits entered, exclusive of Transcripts of Judgments and Judgment Summonses.	Amount of claims entered, exclusive of Transcripts of Judgments and Judgment Summonses.	Number of Transcripts of Judgments received from other Courts.	Amount of claims received by Transcripts of Judgments from other Courts.	Number of Judgment Summonses issued.	Total amount of Suitors' money paid into Court.	Total amount of Suitors' money paid out of Court.	Balance of Cash in Court.	Number of Suits entered, where the amount claimed exceeds $100.	Number of actions for Tort, where the amount claimed exceeds $40.	Number of actions of Replevin, where the value of the goods or other property or effects distrained, taken or detained, exceeds the sum of $40.	Number of Jury Trials by Juries summoned.	Amount paid to Jurors summoned.	Number of Jury Trials by Juries, called in pursuance of Section 122 of "The Division Courts Act."	Amount payable to County Treasurer for "Division Court Jury Fund."	The amount of Fees and Emoluments payable to the Honourable the Treasurer for the use of the Province.	Number of instances in which the Judge has allowed costs to be taxed for Counsel, Attorney or Agents' Fees under Section 16 of "The Division Courts Act," 1880.	The amount of costs so taxed.
			$ c.		$ c.		$ c.	$ c.	$ c.					$ c.		$ c.	$ c.		$ c.
Victoria	1	130	5699 06	14	660 26	16	1170 13	1114 87	55 26	17	....	....	....	.....	2	6 38	.....	.....	.....
	2	133	5195 50	9	730 64	4	1622 92	1622 92	.....	6	1	.....	.....	.....	.....	4 77	.....	.....	.....
	3	93	2955 67	6	256 59	6	953 57	816 51	160 81	3	....	.....	.....	.....	.....	2 28	.....	.....	.....
	4	71	2364 67	4	170 92	9	917 30	947 30	.....	3	....	.....	.....	.....	.....	2 22	.....	.....	.....
	5	420	18187 08	26	1086 70	35	5896 13	5296 41	99 72	35	1	.....	.....	.....	.....	16 88	14 02	7	55 00
	6	86	3163 15	3	137 54	8	980 02	974 87	5 15	10	3	.....	.....	.....	1	4 00	.....	3	25 00
	7	72	1835 04	5	251 28	17	941 82	923 84	17 98	2	1	.....	.....	.....	.....	1 52	.....	.....	.....
Waterloo	1	585	21195 17	27	1313 52	11	7793 11	7347 98	792 43	56	1	.....	....	.....	....	23 18	32 63	.....	.....
	2	91	3812 88	13	620 75	7	1556 39	1552 17	4 22	10	....	.....	.....	.....	.....	4 60	.....	1	8 00
	3	261	8794 22	23	1476 12	3	2139 70	2139 70	.....	22	....	.....	.....	.....	.....	9 49	.....	.....	.....
	4	92	3517 33	6	204 07	1	1603 93	1436 56	167 37	9	....	.....	.....	.....	.....	3 78	.....	.....	.....
	5	107	2985 83	8	560 05	2	1266 56	1266 56	.....	3	1	.....	.....	.....	.....	2 37	.....	.....	.....
	6	103	5068 57	2	168 95	1	2122 43	.....	.....	14	....	.....	.....	.....	.....	5 66	.....	.....	.....

RETURN of Division Court Business.—*Continued.*

THE NAME OF COUNTY, UNITED COUNTIES, OR DISTRICT.	Number of Divisions.	Number of suits entered, exclusive of Transcripts of Judgments and Judgment Summonses.	Amount of claims entered, exclusive of Transcripts of Judgments and Judgment Summonses.	Number of Transcripts of Judgments received from other Courts.	Amount of claims received by Transcripts of Judgments from other Courts.	Number of Judgment Summonses issued.	Total amount of Suitors' money paid into Court.	Total amount of Suitors' money paid out of Court.	Balance of Cash in Court.	Number of Suits entered, where the amount claimed exceeds $100.	Number of actions for Tort, where the amount claimed exceeds $40.	Number of actions of Replevin, where the value of the goods or other property or effects distrained, taken or detained, exceeds the sum of $40.	Number of Jury Trials by Juries summoned.	Amount paid to Jurors summoned.	Number of Jury Trials by Jurors, called in pursuance of Section 122 of "The Division Courts Act."	Amount payable to County Treasurer for "Division Court Jury Fund."	The amount of Fees and Emoluments payable to the Honourable the Treasurer for the use of the Province.	Number of instances in which the Judge has allowed costs to be taxed for Counsel, Attorney or Agents' Fees under Section 16 of "The Division Courts Act," 1880.	The amount of costs so taxed.
			$ c.		$ c.		$ c.	$ c.	$ c.					$ c.		$ c.	$ c.		$ c.
Brought forward ...	272	48352	1876569 81	3612	190490 43	7268	661820 00	651230 49	27948 66	4131	221	78	179	1595 00	45	1801 56	3926 62	367	2241 21
VICTORIA	7	1005	39400 17	67	3233 93	95	12011 89	11696 72	328 92	76	6	.....	....	.....	3	38 05	14 02	11	85 00
WATERLOO	6	1239	45374 00	79	4343 46	25	16482 12	15865 40	964 02	114	2	.....	.....	.....	.....	49 08	32 63	1	8 00
Carried forward ...	285	50596	1961343 98	3758	198067 82	7388	690314 01	678792 61	29241 60	4321	229	78	179	1595 00	48	1888 69	3973 27	379	2334 21

RETURN of Division Court Business.—*Continued.*

The Name of County, United Counties, or District.	Number of Divisions.	Number of suits entered, exclusive of Transcripts of Judgments and Judgment Summonses.	Amount of claims entered, exclusive of Transcripts of Judgments and Judgment Summonses.	Number of Transcripts of Judgments received from other Courts.	Amount of Claims received by Transcripts of Judgments from other Courts.	Number of Judgment Summonses issued.	Total amount of Suitors' money paid into Court.	Total amount of Suitors' money paid out of Court.	Balance of Cash in Court.	Number of Suits entered, where the amount claimed exceeds $100.	Number of actions for Tort, where the amount claimed exceeds $40.	Number of actions of Replevin, where the value of the goods or other property or effects distrained, taken or detained, exceeds the sum of $40.	Number of Jury Trials by Juries summoned.	Amount paid to Jurors summoned.	Number of Jury Trials by Jurors called in pursuance of Section 122 of "The Division Courts Act."	Amount payable to County Treasurer for "Division Court Jury Fund."	The amount of Fees and Emoluments payable to the Honourable the Treasurer for the use of the Province.	Number of instances in which the Judge has allowed costs to be taxed for Counsel, Attorney or Agents' Fees under Section 16 of "The Division Courts Act," 1880.	The amount of costs so taxed.
			$ c.		$ c.		$ c.	$ c.	$ c.					$ c.		$ c.	$ c.		$ c.
Welland	1	286	15395 26	21	1004 36	70	4681 42	4617 94	63 48	45	...	...	...	...	...	15 90	...	5	27 00
	2	84	2118 33	11	543 73	18	1368 46	1440 05	35 24	4	...	...	...	...	...	2 08	...	...	...
	3	123	4265 07	9	244 53	9	3115 95	3057 19	58 76	9	1	1	...	...	...	4 71	...	1	5
	4	209	6493 54	10	93 79	26	2280 91	2282 84	89 29	25	...	...	1	9 00	...	6 37	...	...	...
	5	94	3935 19	12	715 19	6	1283 04	1188 35	94 69	7	...	...	...	...	...	3 97	...	...	...
	6	79	3302 55	9	438 71	7	1989 14	1989 14	.. ....	12	...	...	...	...	...	3 87	...	...	...
Wellington	1	311	13570 17	27	1549 46	32	4663 45	4302 85	360 60	37	1	...	1	9 00	...	15 55	...	5	31 00
	2	25	727 36	4	200 75	2	477 17	477 17	....	1	...	...	...	...	...	70	...	...	...
	3	32	1405 66	2	182 40	5	381 68	348 31	33 37	3	...	...	...	...	...	1 29	...	...	...
	4	183	6817 26	15	902 59	9	1503 52	1503 52	....	14	3	2	...	...	...	6 77	...	1	6 00
	5	61	3162 05	6	537 19	8	1784 01	1755 70	28 31	13	...	...	3	23 00	...	4 06	...	2	10 00
	6	64	2996 60	5	388 70	7	921 05	911 65	10 00	9	...	...	...	...	...	3 24	...	2	20 00
	7	31	1201 60	6	197 23	....	561 32	561 32	....	2	...	...	...	...	...	1 10	...	...	...
	8	223	8744 37	29	1862 66	8	2928 29	2887 04	41 25	27	...	...	...	...	...	10 11	...	...	...
	9	No business done.	...	...	...	...	...	...	.. ....	...	...	...	...	...	...	...	...	...	...
	10	125	5468 70	22	1053 45	8	2150 13	2094 17	55 96	9	...	...	...	...	...	5 25	...	1	10 00
	11	162	7593 92	17	895 56	11	1895 66	1791 42	164 71	20	...	...	...	...	...	8 06	...	2	15 00
	12	111	3764 58	14	728 01	3	2227 77	2111 44	16 33	4	...	...	...	...	...	3 13	...	...	...

RETURN of Division Court Business—*Continued.*

The Name of County, United Counties, or District.	Number of Divisions.	Number of suits entered, exclusive of Transcripts of Judgments and Judgment Summonses.	Amount of claims entered, exclusive of Transcripts of Judgments and Judgment Summonses.	Number of Transcripts of Judgments received from other Courts.	Amount of claims received by Transcripts of Judgments from other Courts.	Number of Judgment Summonses issued.	Total amount of Suitors' money paid into Court.	Total amount of Suitors' money paid out of Court.	Balance of Cash in Court.	Number of Suits entered, where the amount claimed exceeds $100.	Number of actions for Tort, where the amount claimed exceeds $10.	Number of actions of Replevin, where the value of the goods or other property or effects distrained, taken, or detained, exceeds the sum of $10.	Number of Jury Trials by Juries summoned.	Amount paid to Jurors summoned.	Number of Jury Trials by Juror, called in pursuance of Section 122 of "The Division Courts Act."	Amount payable to County Treasurer for "Division Court Jury Fund."	The amount of Fees and Emoluments payable to the Honourable the Treasurer for the use of the Province.	Number of instances in which the Judge has allowed costs to be taxed for Counsel, Attorney or Agents' Fees under Section 16 of "The Division Courts Act," 1880.	The amount of costs so taxed.
			$ c.		$ c.		$ c.	$ c.	$ c.					$ c.		$ c.	$ c.		$ c.
Brought forward ..	285	50596	1961343 98	3758	198067 82	7388	690314 01	678792 61	39241 60	4321	229	78	179	1595 00	48	1888 69	3973 27	379	2334 21
Welland	6	875	35509 94	72	3040 31	136	14718 92	14575 51	341 46	102	1	1	1	9 00	....	36 90	.....	6	32 00
Wellington	12	1328	55452 27	147	8498 00	93	19494 05	18743 99	710 53	139	4	2	4	32 00	....	59 26	.....	13	92 00
Carried forward ...	303	52799	2052306 19	3977	209606 13	7617	724526 98	712112 11	39293 59	4562	234	81	184	1636 00	48	1984 85	3973 27	398	2458 21

RETURN of Division Court Business.—*Continued.*

The Name of County, United Counties, or District.	Number of Divisions.	Number of suits entered, exclusive of Transcripts of Judgments and Judgment Summonses.	Amount of claims entered, exclusive of Transcripts of Judgments and Judgment Summonses.	Number of Transcripts of Judgments received from other Courts.	Amount of claims received by Transcripts of Judgments from other Courts.	Number of Judgment Summonses issued.	Total amount of Suitors' money paid into Court.	Total amount of Suitors' money paid out of Court.	Balance of Cash in Court.	Number of Suits entered, where the amount claimed exceeds $100.	Number of actions for Tort, where the amount claimed exceeds $40.	Number of actions of Replevin, where the value of the goods or other property or effects distrained, taken or detained, exceeds the sum of $40.	Number of Jury Trials by Juries summoned.	Amount paid to Jurors summoned.	Number of Jury Trials by Jurors, called in pursuance of Section 122 of "The Division Courts Act"	Amounts payable to County Treasurer for Division Court Jury Fund."	The amount of Fees and Emoluments payable to the Honourable the Treasurer for the use of the Province.	Number of instances in which the Judge has allowed costs to be taxed for Counsel, Attorney or Agents' Fees under Section 16 of "The Division Courts Act," 1880.	The amount of costs so taxed.
			$ c.		$ c.		$ c.	$ c.	$ c.					$ c.		$ c.	$ c.		$ c.
WENTWORTH	1	896	40781 44	29	1650 86	116	10823 21	10643 04	471 27	78	....	2	2	14 00	2	36 36	342 40	3	25 00
	2	153	4837 28	5	229 00	34	1561 97	1533 46	61 55	8	....	....	....	.....	....	4 28	.....	1	10 00
	3	40	1353 72	6	139 61	8	261 31	261 31	.....	2	....	....	....	.....	....	1 10	.....	.....	.....
	4	80	2459 66	7	381 15	3	966 75	950 21	28 00	5	....	1	....	.....	....	2 54	.....	.....	.....
	5	31	1197 89	2	31 21	1	319 16	313 16	6 00	4	....	....	....	.....	....	1 54	.....	.....	.....
	6	38	1781 05	8	590 91	5	1252 32	1190 08	62 24	5	....	....	1	12 00	....	2 29	.....	.....	.....
	7	32	1496 61	....	37 33	3	524 73	524 73	.....	4	....	....	....	.....	....	1 51	.....	.....	.....
	8	16	425 90	....	.....	2	259 31	259 31	.....	....	....	....	....	.....	....	30	.....	.....	.....
	9	601	27187 97	19	1204 12	89	8616 98	8382 78	1406 61	65	2	3	3	21 00	....	28 76	105 32	1	5 00
	1	2682	146667 62	96	6364 53	1019	25453 23	25013 18	440 05	444	7	7	5	32 00	....	173 58	1883 69	3	25 00
	2	230	10559 11	14	1115 31	60	4429 82	4324 47	105 35	29	....	....	1	17 00	1	11 45	.....	1	2 50
	3	73	3710 85	3	100 84	19	1540 75	1539 99	44 23	11	....	....	....	.....	....	4 22	.....	1	5 00
	4	316	12526 43	28	1576 68	47	3715 63	3998 39	.....	29	3	....	....	.....	....	13 85	.....	3	20 00
	5	97	3406 95	15	1025 35	7	1235 25	1196 15	290 28	6	....	1	....	.....	....	3 51	.....	1	10 00
	6	189	10863 99	8	542 57	34	3665 90	3467 86	198 04	39	2	....	2	15 00	....	13 20	.....	1	5 00
	7	129	8137 21	2	82 95	12	2272 31	2362 96	31 75	33	....	....	....	.....	....	10 20	.....	.....	.....
	8	179	7454 05	12	921 86	28	2074 37	1767 45	306 92	10	....	1	2	12 00	....	6 49	.....	.....	.....
	9	34	1251 29	4	363 66	7	754 64	758 43	7 21	2	....	....	....	.....	....	1 22	.....	.....	.....
	10	3752	196760 11	111	7054 97	1281	33277 25	33074 31	202 94	471	1	2	5	59 00	....	195 87	2793 20	8	46 00

RETURN of Division Court Business.—*Continued.*

THE NAME OF COUNTY, UNITED COUNTIES, OR DISTRICT.	Number of Divisions.	Number of suits entered, exclusive of Transcripts of Judgments and Judgment Summonses.	Amount of claims entered, exclusive of Transcripts of Judgments received from other Courts.	Number of Transcripts of Judgments received from other Courts.	Amount of claims received by Transcripts of Judgments from other Courts.	Number of Judgment Summonses issued.	Total amount of Suitors' money paid into Court.	Total amount of Suitors' money paid out of Court.	Balance of Cash in Court.	Number of Suits entered, where the amount claimed exceeds $100.	Number of actions for Tort, where the amount claimed exceeds $40.	Number of actions of Replevin, where the value of the goods or other property or effects distrained, taken or detained, exceeds the sum of $40.	Number of Jury Trials by Juries summoned.	Amount paid to Jurors summoned.	Number of Jury Trials by Jurors, called in pursuance of Section 122 of "The Division Courts Act."	Amount payable to County Treasurer for "Division Court Jury Fund."	The amount of Fees and Emoluments payable to the Honourable the Treasurer for the use of the Province.	Number of instances in which the Judge has allowed costs to be taxed for Counsel, Attorney or Agents' Fees under Section 16 of "The Division Courts Act," 1880.	The amount of costs so taxed.
			$ c.		$ c.		$ c.	$ c.	$ c.					$ c.		$ c.	$ c.		$ c.
Brought forward...	303	52799	2052306 19	3977	209606 13	7617	724526 98	712112 11	20293 59	4562	234	81	184	1636 00	48	1984 85	3973 27	398	2458 21
WESTWORTH . .	9	1887	81521 52	77	4261 28	261	24585 74	24058 08	2035 67	171	2	6	6	47 00	2	78 68	447 72	5	40 00
YORK	10	7681	401337 61	283	19448 72	2514	78419 15	77503 14	1626 77	1074	13	11	15	135 00	1	433 59	676 89	18	113 50
GRAND TOTAL	322	62367	2538165 32	4317	233319 13	10392	827531 87	813673 33	23956 03	5807	249	98	205	1818 00	51	2497 12	3997 88	421	2611 71

RETURN of Division Court Business.—*Continued.*

THE NAME OF COUNTY, UNITED COUNTIES, OR DISTRICT.	Number of Divisions.	Number of suits entered, exclusive of Transcripts of Judgments and Judgment Summonses.	Amount of claims entered, exclusive of Transcripts of Judgments and Judgment Summonses.		Number of Transcripts of Judgments received from other Courts.	Amount of claims received by Transcripts of Judgments from other Courts.		Number of Judgment Summonses issued.	Total amount of Suitors' money paid into Court.		Total amount of Suitors' money paid out of Court.		Balance of Cash in Court.		Number of Suits entered, where the amount claimed exceeds $100.	Number of actions for Tort, where the amount claimed exceeds $40.	Number of actions of Replevin, where the value of the goods or other property or effects distrained, taken or detained, exceeds the sum of $40.	Number of Jury Trials by Juries summoned.	Amount paid to Jurors summoned.		Number of Jury Trials by Jurors, called in pursuance of Section 122 of "The Division Courts Act."	Amount payable to County Treasurer for "Division Court Jury Fund."		The amount of Fees and Emoluments payable to the Honourable the Treasurer for the use of the Province.		Number of instances in which the Judge has allowed costs to be taxed for Counsel, Attorney or Agents' Fees under Section 16 of "The Division Courts Act," 1880.	The amount of costs so taxed.	
			$	c.		$	c.		$	c.	$	c.	$	c.					$	c.		$	c.	$	c.		$	c.
Grand Total.....	322	62367	2555165	32	4347	233319	13	10392	827531	87	813673	38	23956	03	5807	249	98	205	1818	00	51	2497	12	9097	88	421	2611	71
Grand Totals, 1889.	323	63054	2447196	68	4590	230317	05	9842	830909	00	818099	94	.....		5126	241	95	253	2093	50	47	2374	54	8628	21	371	2251	01
Grand Totals, 1888.	320	65878	2599939	47	4724	245864	37	9290	880766	42	865528	40	...	...	5245	326	116	184	1897	00	62	2562	48	9392	14	441	2699	22
Grand Totals, 1887.	323	61169	2368491	56	4271	214393	81	7874	821981	15	810255	03	.....		4842	376	131	188	1745	63	98	2334	18	7465	14	394	2346	65
Grand Totals, 1886.	319	57803	2008528	50	3046	193213	50	8004	804544	88	790487	68	.....		4551	338	118	203	1961	00	93	2249	28	6253	30	392	2140	00
Grand Totals, 1885.	311	60391	2207142	47	4163	219010	55	8048	797050	88	823061	09	.....		4553	287	109	225	2222	91	66	2399	47	6485	19	418	2742	77

TABLE B.

List of Division Court Clerks, their Post Office Address, the County and Number of Division in which their Courts are situated, for the Province of Ontario, up to 31st December, 1890, inclusive

County.	No. of Division.	Name of Clerk.	Post Office Address.
Algoma	1	E. Biggings	Sault Ste. Marie.
	2	Robert E. Miller	Bruce Mines.
	3	Wm. L. Nicholls	Thessalon.
	6	Wm. J. Smith	Richard's Landing.
Brant	1	Joseph Robinson	Brantford.
	2	John K. Finlayson	Paris.
	3	David Baptie	St. George.
	4	Hy. Cox	Burford.
	5	J. R. Malcolm	Scotland.
	6	Thomas F. Simpson	Onondaga.
Bruce	1	Wm. Collins	Walkerton.
	2	H. B. O'Connor	Teeswater.
	3	Joseph Barker	Kincardine.
	4	N. McKechnie	Paisley.
	5	James McKinnon	Port Elgin.
	6	Hugh Murray	Underwood.
	7	A. Neelands	Invermay.
	8	James Walmsley	Wiarton.
	9	Angus Martyn	Ripley.
	10	W. Moshier	Lion's Head.
Carleton	1	J. R. Armstrong	Ottawa
	2	H. Reilly	Richmond.
	3	Henry W. McDougall	Carp.
	4	W. P. Taylor	Fitzroy Harbour.
	5	John Kerr	Kars.
	6	Ira Morgan	Metcalf.
	7	F. W. Harmer	Hintonburgh.
Dufferin	1	Joseph Pattullo	Orangeville.
	2	Alexander McLachlan	Shelburne.
	3	J. A. Love	Stanton.
	4	James Henry	Mono Mills.
	5	R. E. Hamilton	Grand Valley.
Elgin	1	A. Love	Aylmer.
	2	Alex. McBride	St. Thomas.
	3	Alex. McBride	St. Thomas.
	4	A. N. C. Black	Dutton.
Essex	1	James A. Stewart	Sandwich.
	2	J. H. C. Leggatt	Amherstburg.
	3	E. Allworth	Kingsville.
	4	C. Bell	Oxley.
	5	George A. Morse	Leamington.
	6	E. P. Bonteiller	Belle River.
	7	John McCrae	Windsor.
	8	John Milne	Essex Centre.
	9	Wm. Mann	Comber.

List of Division Court Clerks, etc.—*Continued.*

County.	No. of Division.	Name of Clerk.	Post Office Address.
Frontenac	1	Wm. Robinson	Kingston.
	2	P. McKim	Kingston.
	3	C. Ruttan	Sydenham.
	4	A. Grant	Verona.
	5	John McGrath	Sunbury.
	6	Jesse Shibley	Sharbot Lake.
Grey	1	Benjamin Allen	Owen Sound.
	2	David Jackson, jr.	Durham.
	3	Thomas Plunkett	Meaford.
	4	T. J. Rorke	Heathcote.
	5	J. W. Armstrong	Flesherton.
	6	John McDonald	Chatsworth.
	7	Duncan Campbell	Hanover.
	8	Wm. Brown	Markdale.
Haldimand	1	D. McGregor	Caledonia.
	2	David T. Rogers	Cayuga.
	3	T. Armour	Dunnville.
	4	R. A. Havill	Rainham.
	5	Elgin Birdsall	Canboro'.
	6	C. E. Bourne	Jarvis.
Haliburton	1	C. D. Curry	Minden.
	2	Wm. Prust	Haliburton.
	3	Stephen Kettle	Ursa.
Halton	1	Wm. Panton	Milton.
	2	R Balmer	Oakville.
	3	Lachlan Grant	Georgetown.
	4	J. Matthews	Acton.
	5	S. R. Lister	Campbellville.
	6	James Robinson	Burlington.
Hastings	1	Harford Ashley	Belleville.
	2	Fras. B. Prior	Wallbridge.
	3	A. B. Randall	Shannonville.
	4	T. McCann	Tweed.
	5	F. B. Parker	Stirling.
	6	Arthur W. Coe	Madoc.
	7	A. S. Valleau	Deseronto.
	8	J. Sills	Canifton.
	9	James B. Young	Trenton.
	10	Marcus H. Powell	Marmora.
	11	James E. Harrison	Bridgewater.
	12	J. Wilson	L'Amable.
Huron	1	Charles Seager	Goderich.
	2	John Beattie	Seaforth.
	3	W. W. Farran	Clinton.
	4	A. Hunter	Brussels.
	5	T. Trivitt	Exeter.
	6	Wm. McArthur	Dungannon.
	7	John Morgan	Bayfield.
	8	James McGuire	Wingham.
	9	Joseph Cowan	Wroxeter.
	10	M. Zeller	Zurich.
	11	Wm. Lewis	Crediton.
	12	Miles Young	Blyth.

List of Division Court Clerks, etc.—*Continued.*

County.	No. of Division.	Name of Clerk.	Post Office Address.
Kent	1	W. B. Wells	Chatham.
	2	J. Duck	Ridgetown.
	3	S. Wallace	Dresden.
	4	Malcolm Samson	Blenheim.
	5	D. C. McDonald	Wallaceburg.
	6	George Moore	Bothwell.
	7	D. R. Farquharson	Fletcher.
Lambton	1	H. M. Pousett	Sarnia.
	2	Wm. McLeay	Watford.
	3	W. Webster	Florence.
	4	William W. Stover	Sombra.
	5	T. R. K. Scott	Forest.
	6	Martin Wattson	Thedford.
	7	John McRae	Mooretown.
	8	W. G. Fraser	Petrolea.
	9	Richard Code	Alvinston.
Lanark	1	R. Jamieson	Perth.
	2	W. A. Field	Lanark.
	3	F. McEwen	Carleton Place.
	4	G. F. McKinnon	Smith's Falls.
	5	Alex. Graham	Pakenham.
	6	Wm. P. McEwen	Almonte.
Leeds and Grenville	1	D. B. Jones	Brockville.
	2	B. White	Prescott.
	3	S. McCammon	Gananoque.
	4	Oliver Bascom	Kemptville.
	5	E. H. Whitmarsh	Merrickville.
	6	M. S. Denaut	Delta.
	7	Cyrus A. Wood	Toledo.
	8	L. S. Lewis	Newboro'.
	9	Isaac C Alguire	Farmersville.
	10	G. Fairbairn	Spencerville.
	11	J. B. Bellamy	North Augusta.
	12	M. J. Connolly	Caintown.
Lennox and Addington	1	George D. Hawley	Napanee.
	2	Fred. W. Armstrong	Bath.
	3	J. J. Watson	Adolphustown.
	4	P. Johnstone	Camden East.
	5	W. Whelan	Centreville.
	6	J. A. Timmerman	Odessa.
	7	James Aylsworth	Tamworth.
Lincoln	1	James B. Secord	Niagara.
	2	W. A. Mittleberger	St. Catharines.
	3	Isaac Springstead	Smithville.
	4	C. E. Riggins	Beamsville.
Manitoulin	1	Jas. Fraser	Gore Bay.
	2	Herman Currie	Little Current.
	3	W. J. Tucker	Manitowaning.
Middlesex	1	W. J. McIntosh	London.
	2	William Dickson	Parkhill.
	3	Robt. J. McNamee	Lucan.
	4	W. C. Harris	Delaware.
	5	G. Wilson	Glencoe.
	6	Edward Rowland	Strathroy.
	7	Isaac N. Burdick	Dorchester Station.
	8	Walter R. Westlake	Arva.
	9	E. S. Jarvis	London.

List of Division Court Clerks, etc.—*Continued.*

County.	No. of Division.	Name of Clerk.	Post Office Address.
Muskoka	1	T. M. Bowerman	Bracebridge.
	2	J. H. Jackson	Severn Bridge.
	3	J. R. Reece	Huntsville.
	4	R. G. Penson	Port Carling.
Nipissing	1	J. D Cockburn	Sturgeon Falls.
	2	John McMeekin	Mattawa.
	3	John G. Cormack	North Bay.
	4	Thomas J. Ryan	Sudbury.
Norfolk	1	Charles E. Freeman	Simcoe.
	2	Ed. Matthews	Waterford.
	3	R. Green	Windham Centre.
	4	Jas. F. Cohoe	Ronson.
	5	M. J. McCall	Vittoria.
	6	S. P. Mabee	Port Rowan.
	7	D. C. Brady	Houghton.
	8	Lawrence Skey	Port Dover.
Northumberland and Durham	1	F. Cubitt	Bowmanville.
	2	S. Wilmot	Newcastle.
	3	G. M. Furby	Port Hope.
	4	John Hunter	Millbrook.
	5	A. G. Boswell	Cobourg.
	6	H. Lawless	Grafton.
	7	M. H. Peterson	Colborne.
	8	M. P. Ketchum	Brighton.
	9	R. P. Hurlburt	Warkworth.
	10	T. R. Garrett	Wooler.
	11	D. Kennedy	Campbellford.
Ontario	1	D. C. Macdonell	Whitby.
	2	M. Gleeson	Greenwood.
	3	J. W. Burnham	Port Perry.
	4	Jos. E. Gould	Uxbridge.
	5	Geo. Smith	Cannington.
	6	G. F. Bruce	Beaverton.
	7	F. J. Gillespie	Uptergrove.
Oxford	1	F. W. Macqueen	Woodstock.
	2	M. F. Ainslie	Drumbo.
	3	James Munro	Embro.
	4	Jas. Barr	Norwich.
	5	James Stevens	Ingersoll.
	6	John C. Ross	Tilsonburg.
Parry Sound	1	R. H. Stewart	Parry Sound.
	2	David Patterson	McKellar P. O.
	3	E. Sirrett	Rosseau.
	4	Walter Sharpe	Burk's Falls.
	5	J. G. Best	Maganetawan.
	6	R. B. Maw	Commanda.
	7	Benjamin McDermott	Sundridge.

List of Division Court Clerks, etc.—*Continued.*

County.	No. of Division.	Name of Clerk.	Post Office Address.
Peel	1	J. W. Main	Brampton.
	2	Thomas K. Beaty	Streetsville.
	3	John Harris	Caledon.
	4	David Pearcy	Bolton.
Perth	1	D. B. Burritt	Stratford.
	2	George K. Matheson	Mitchell.
	3	E. Long	St. Mary's.
	4	G. Brown	Shakespeare.
	5	Thomas Trow	Milverton.
	6	W. J. Hay	Listowel.
Peterborough	1	Francis James Bell	Peterborough.
	2	Thomas Fraser	Norwood.
	3	T. Campbell	Keene.
	4	W. Sherin	Lakefield.
	5	C. R. D. Booth	Apsley.
Prescott and Russell	1	David Buchan	L'Orignal.
	2	John Shields	Vankleek Hill.
	3	W. Allison	Stardale.
	4	Joseph Belanger	Plantagenet.
	5	J. S. Cameron	Cumberland.
	6	A. Carson	Russell.
	7	M. J. Costello	Hawkesbury.
	8	J. Downing	Fournier.
	9	F. W. Langrell	Alfred.
	10	Telesphore Rochon	Clarence Creek.
	11	Peter Stewart	Grant.
Prince Edward	1	Francis McManus	Picton.
	2	Henry Hullett Haight	Milford.
	3	Charles H. Wright	Demorestville.
	4	William C. Delong	Ameliasburg.
	5	John W. Clarke	Wellington.
	6	A. B. Saylor	Bloomfield.
	7	J. M. Cadman	Consecon.
	8	B. E. Harrison	Waupoos.
Rainy River	1	P. H. Clark	Rat Portage.
	2	William Wilson	Fort Francis.
Renfrew	1	W. C. Irving	Pembroke.
	2	Hugh R. Dunn	Beachburg.
	3	George Eady, jr.	Renfrew.
	4	George E. Neilson	Arnprior.
	5	John Barnard	Shamrock.
	6	James Reeves	Eganville.
	7	Robert Allen	Cobden.
	8	J. C. Gurney	Rockingham.

List of Division Court Clerks, etc.—*Continued.*

County.	No. of Division.	Name of Clerk.	Post Office Address.
Simcoe	1	J. C. McNab	Barrie.
	2	Thomas S. Graham	Bradford.
	3	Joel Rogers	Beeton.
	4	R. G. Campbell	Collingwood.
	5	A. Craig	Craighurst.
	6	J. P. Henderson	Orillia.
	7	J. A. Mather	New Lowell.
	8	J. G. Hood	Alliston.
	9	Harry Jennings	Penetanguishene.
	10	J. C. Steele	Coldwater.
Stormont, Dundas and Glengarry	1	G. H. McGillivray	Williamstown.
	2	John A. McDougald	Alexandria.
	3	C. J. Mattice	Cornwall.
	4	Asaph Dawson	Dickinson's Landing.
	5	Wm. Garvey	Morrisburg.
	6	J. N. Tuttle	Iroquois.
	7	W. J. Ridley	South Mountain.
	8	J. A. Cockburn	Crysler.
	9	Duncan C. McRae	North Lancaster.
	10	W. Rae	Chesterville.
	11	D. McIntosh	Strathmore.
	12	George Hearndon	Alexandria.
Thunder Bay	1	Neil McDougall	Port Arthur.
	2	John Aikins	English River.
	3	William McLean	Fort William.
Victoria	1	Peter McIntyre	Woodville.
	2	Edward D. Hand	Fenelon Falls.
	3	Irvine Junkin	Bobcaygeon.
	4	James D. Thornton	Omemee.
	5	O. J. McKibbin	Lindsay.
	6	J. F. Cummings	Oakwood.
	7	A. C. Graham	Victoria Road.
Waterloo	1	A. J. Peterson	Berlin.
	2	Otto Klotz	Preston.
	3	Thomas Field	Galt.
	4	J. Allchin	New Hamburg.
	5	Alfred Boomer	Linwood.
	6	J. L. Wideman	St. Jacob's.
	7	W. D. Watson	Ayr.
Welland	1	G. L. Hobson	Welland.
	2	Paul J. Wilson	Marshville.
	3	T. Newbigging	International Bridge.
	4	J. A. Orchard	Niagara Falls, South.
	5	William Gearin	Thorold.
	6	A. K. Schofield	Port Colborne.

List of Division Court Clerks, etc.—*Continued.*

County.	No. of Division.	Name of Clerk.	Post Office Address.
Wellington	1	Geo. Howard	Guelph.
	2	William Nicoll	Morriston.
	3	Hugh Black	Rockwood.
	4	T. W. Thomson	Fergus.
	5	W. Tyler	Erin.
	6	Henry Clarke	Elora.
	7	L. R. Adams	Drayton.
	8	Daniel Driscoll	Arthur.
	9	Joseph Patullo	Orangeville.
	10	John Livingstone	Harrist n.
	11	J. C. Wilkes	Mount Forest.
Wentworth	1	H. T. Bunbury	Hamilton.
	2	F. D. Suter	Dundas.
	3	Hugh Thomson	Waterdown.
	4	W. McDonald	Rockton.
	5	A. G. Jones	Stoney Creek.
	6	L. A. Gurnet	Ancaster.
	7	J. McClement	Glanford.
	8	Samuel C. Wright	Binbrook.
	9	R. L. Gunn	Hamilton.
York	1	A. McL. Howard	Toronto.
	2	J. Stephenson	Unionville.
	3	J. M. Lawrence	Richmond Hill.
	4	D. Lloyd	Newmarket.
	5	Warren P. Cole	Sutton, West.
	6	A. Armstrong	Lloydtown.
	7	John Nattrass	Woodbridge.
	8	John Linton	Weston.
	9	J. H. Richardson	West Hill.
	10	E. H. Duggan	Toronto.

TABLE C.

List of Division Court Bailiffs, their Post Office Address, the County and Number of Division in which their Courts are situated, for the Province of Ontario, up to 31st December, 1890, inclusive.

County.	No. of Division.	Name of Bailiff.	Post Office Address.
Algoma	1	Robert Rush	Sault Ste. Marie.
	2	James Mills	Bruce Mines.
	3	Jacob Stevenson	Thessalon.
	6	Daniel McPhail	Marksville, St. Jos. Is.
Brant	1	Joseph Jackson	Brantford.
	2	A. Huson	Paris.
	3	G. S. Waite	St. George.
	4	Daniel Dunn	Burford.
	5	Charles Wheeland	Scotland.
	6	Matthew Day	Onondaga.
Bruce	1	M. Thompson	Walkerton.
	2	P. Corrigan	Holywood.
		John Farquharson	Teeswater.
	3	Alex. Campbell	Kincardine.
	4	W. W. Hogg	Paisley.
	5	M. Hunter	Port Elgin.
	6	Gore Leggett	Underwood.
	7	Chas. A. Richards	Tara.
	8	H. Trout	Wiarton.
	9	John McRitchie	Ripley.
	10	Edward Barley	Lion's Head.
Carleton	1	R. Hamilton	Ottawa.
		John Whitton	Ottawa.
	2	John Reilly	Richmond.
	3	Wm. Falls	Carp.
	4	W. A. Shirreff	Fitzroy Harbor.
	5	Wesley Hicks	Kars.
	6	John Watt	Metcalfe.
	7	A. Wilson	Hintonburgh.
Dufferin	1	James McQuarrie	Orangeville.
	2	E. F. Bowes	Shelburne.
	3	A. Cauthers	Stanton.
	4	James McQuarrie	Orangeville.
	5	Alfred Finbow	Grand Valley.
Elgin	1	W. W. White	Aylmer.
	2	Henry Thornton	St. Thomas.
	3	Henry Thornton	St. Thomas.
	4	Duncan McGregor	Eagle.
Essex	1	Allois Master	Sandwich.
	2	William Kelly	Amherstburgh.
		C. Wright	Amherstburgh.
	3	George Malott	Kingsville.
	4	W. L. Hughson	Harrow.
	5	J. McGaw	Leamington.
		Jesse T. Brown	Leamington.
	6	Joseph Lupien	Comber.
	7	Aurele Pacaud	Windsor.
		J. S. Askew	Windsor.
	8	Richard E. Millard	Essex Centre.
	9	Raphael Marion	Chevalier.

List of Division Court Bailiffs, etc.—*Continued.*

County.	No. of Division.	Name of Bailiff.	Post Office Address.
Frontenac	1	Geo. Greenwood	Wolfe Island.
	1	J. A. Gardner	Kingston.
	2	John A. Gardner	Kingston.
	3	James Cosgrove	Oates.
	4	Henry Sly	Verona.
	5	William J. Arthur	Battersea.
	6	Thomas B. Campbell	Oso Station.
	6	Matthew W. Price	Mountain Grove.
	6	Harmon W. Hunt	Sharbot Lake.
	6	Samuel Mitchell	Plevna.
Grey	1	Robert Edgar	Owen Sound.
	2	James Carson	Durham.
	3	George Brown	Meaford.
	4	George Mitchell	Clarksburg.
	5	A. S Vandusen	Flesherton.
	6	W. B. Simpson	Chatsworth.
	7	John Small	Hanover.
	8	W. G. Pickell	Markdale.
Haldimand	1	E. J. Wigg	Caledonia.
	2	Andrew Finlan	Cayuga.
	3	J. Clemow	Dunnville.
	4	David Byers	Selkirk.
	5	E. W. Robins	Canboro'.
	6	F. Hartwell	Jarvis.
Haliburton	1	R. C. Garratt	Minden.
	2	John Stothart	Haliburton.
	3	Adam Graham	Ursa.
Halton	1	J. A. Fraser	Milton.
	2	Robert Lucas	Oakville.
	3	Alfred Benham	Georgetown.
	4	William Hemstreet	Acton.
	5	E. Chapman	Campbellville.
	6	J. W. Henderson	Burlington.
Hastings	1	Peter Maybee	Belleville.
	1	John H. Gordon	Belleville.
	2	J. E. Bleeker	Frankford.
	3	W. E. Pearsall	Shannonville.
	4	W. J. Bowell	Tweed.
	5	C. Butler	Stirling.
	6	John Allen Huff	Madoc.
	7	J. L. Ferguson	Deseronto.
	8	D. Phillips	Foxboro'.
	9	Wm. Henry Garratt	Trenton.
	9	Lewis Cruickshank	"
	10	James C. Bowen	Marmora.
	11	James Mairs	Bridgewater.
	12	Walter Mullett	Bancroft.
	12	B. H. Sweet	"
Huron	1	John Knox	Goderich.
	2	Joseph D. Brine	Seaforth.
	3	D. Dickenson	Clinton.
	4	Finlay S. Scott	Brussels.
	5	John Gill	Exeter.
	6	Joseph Mallough	Dungannon.
	7	J. Ferguson	Bayfield.
	8	Francis Patterson	Wingham.
	9	John Brethauer	Wroxeter.
	10	Phillip Sipple	Zurich.
	11	J. Beanes	Crediton.
	12	William Campbell	Blyth.

List of Division Court Bailiffs, etc.—*Continued.*

County.	No. of Division.	Name of Bailiff.	Post Office Address.
Kent	1	Charles J. Moore	Chatham.
	1	T. H. Nelson	Chatham.
	2	Wm. Teetzel	Ridgetown.
	3	Alex. Cuthbert	Dresden.
	4	W. R. Fellows	Blenheim.
	4	John M. Burke	Blenheim.
	5	Thomas Forham	Wallaceburgh.
	6	G. A. Bobier	Thamesville.
	6	S. J. Thomas	Bothwell.
	7	M. Dillon	Merlin.
Lambton	1	Robert Miller	Sarnia.
	2	J. F. Elliott	Watford.
	3	Richard L. Bobier	Florence.
	4	N. Cornwall	Sombra.
	5	Eugene Mason	Wyoming.
	6	J. G. Braddon	Thedford.
	7	John McGill	Corunna.
	8	John Sinclair	Petrolia.
	9	W. Fitzpatrick	Alvinston.
Lanark	1	James Patterson	Perth.
	2	Robert Watt	Lanark.
	3	John McPherson	Carleton Place.
	4	H. D. Chalmers	Smith's Falls.
	5	Thomas Somerton	Pakenham.
	6	John Slattery	Almonte.
Leeds and Grenville	1	H. McPhail	Brockville.
	1	Uri Marshall	Brockville.
	2	Chas. H. Rowe	Prescott.
	3	Edward McE. Hiscocks	Gananoque.
	4	J. Dickinson	Kemptville.
	5	P. Dowdall	Merrickville.
	6	W. H. Denaut, jr	Delta.
	6	S. R. Ransom	Delta.
	7	R. Richards	Frankville.
	8	Chester Stuart	Newboro'.
	8	W. S. Bilton	Westport.
	9	G. W. Brown	Farmersville.
	10	Wm. Stitt, jr	Spencerville.
	10	Jas. P. Lawrence	Spencerville.
	11	S. J. Whaley	North Augusta.
	12	W. J. Mallory	Mallorytown.
Lennox and Addington	1	Z. Ham	Napanee.
	2	R. R. Finkle	Bath.
	3	D. Daverne	Adolphustown.
	4	Z. Ham	Napanee.
	5	P. Vandewater	Centreville.
	6	John W. Denyes	Odessa.
	7	P. F. Carscallen	Tamworth.
	7	Andrew Cowan	Vennachar.
	8	Thos. Neal	Cloyne.
Lincoln	1	P. Henigan	Niagara.
	2	Richard E. Boyle	Merritton.
	3	A. D. Lacey	Smithville.
	4	Jas. F. Carter	Beamsville.

List of Division Court Bailiffs, etc.—*Continued.*

County.	No. of Division.	Name of Bailiff.	Post Office Address.
Manitoulin	1	Peter J. Anderson	Gore Bay.
	2	D. McKenzie	Little Current.
	3	John Gorley	Manitowaning.
Middlesex	1	John Burns	London East.
	2	Edward Manes	Parkhill.
	3	G. W. Hodgins	McGillivray.
	4	Henry Lockwood	Delaware.
	5	John A. McAlpin	Glencoe.
	6	Thomas O. Curry	Strathroy.
	7	John Beverley	Dorchester Station.
	8	Wm. H. Brock	Arva.
	9	L. W. Stevens	London.
Muskoka	1	W. J. Hill	Bracebridge.
	2	T. M. Robinson	Gravenhurst.
	3	C. Peacock	Huntsville.
	4	Roger Mahon	Port Carling.
Nipissing	1	Louis Joudouin	Sturgeon Falls.
	2	X. Ranger	Mattawa.
	3	Wesley Coleman	North Bay.
	4	William Irving	Sudbury.
Norfolk	1	E. G. Wells	Simcoe.
	2	Edward Grace	Waterford.
	3	D. C. Wood	Simcoe.
	4	Robert Power	Delhi.
	5	Jos. W. Shearer	Vittoria.
	6	Henry C. Ellis	Port Rowan.
	7	H. J. Mitchener	Clear Creek.
	8	Hiram Fairchild	Port Dover.
Northumberland and Durham	1	Henry Metcalfe	Bowmanville.
	2	N. A. Jerome	Orono.
	3	John Grimson	Port Hope.
	4	Wm. Carveth	Millbrook.
	5	O. Dean	Cobourg.
	6	Thomas Patterson	Grafton,
	7	John Reives	Colborne.
	8	Wm. Martin	Brighton.
	9	David Robertson	Warkworth.
	10	Arthur Terrill	Wooler.
	11	Thos. G. Gillespie	Campbellford.
Ontario	1	J. W. Palmer	Whitby.
	2	Levi Mackey	Greenwood.
	3	James D. Paxton	Port Perry.
	4	J. C. Widdifield	Uxbridge.
	5	R. J. Harwood	Cannington.
	6	James C. Edgar	Beaverton.
	7	Joseph Fox	Millington.

List of Division Court Bailiffs, etc.—*Continued.*

County.	No. of Division.	Name of Bailiff.	Post Office Address.
Oxford	1	M. Virtue	Woodstock.
	2	L. S. Kennedy	Richwood.
	3	Geo. C. McKay	Embro.
	4	Wm. Stroud	Norwich.
	5	James Brady	Ingersoll.
	6	M. Dillon	Tilsonburg.
Parry Sound	1	James Coff	Byng Inlet.
		T. W. George	Parry Sound.
	2	W. J. Moffatt	McKellar.
	3	Arthur Beanes	Rosseau.
	4	Walter H. Sylvester	Burk's Falls.
	5	William E. Kennedy	Magnetawan.
	6	David Ricker	Commanda.
	7	Archibald McDonald	Sundridge.
Peel	1	Geo. William Broddy	Brampton.
	2	John H. Glendening	Streetsville.
	3	James K. Leslie	Caledon.
	4	J. C. Switzer	Albion.
Perth	1	Thomas Tobin	Stratford.
		Thomas S. Tobin	Stratford.
	2	J. S. Coppin	Mitchell.
	3	William Box	St. Mary's.
	4	J. W. Donaldson	Shakespeare.
	5	Alex. Munro	Milverton.
	6	Robert Hay	Listowel.
Peterborough	1	Joseph Griffin	Peterboro'.
	2	A. R. Anderson	Norwood.
	3	Joseph Elmhirst	Keene.
	4	R. Chappin	Lakefield.
	5	R. Elmhirst	Apsley.
Prescott and Russell	1	M. Costello	L'Orignal.
	2	Thomas Shields	Vankleek Hill.
	3	P. Kelly	St. Eugene.
	4	Wm. Adolphus McKay	Plantagenet.
	5	Docitte Lavergne	Cumberland.
	6	Thomas Young	Russell.
	7	M. Costello	L'Orignal.
	8	C. Gates	Fournier.
		Victor Leger	St. Isadore.
	9	Jules Boileau	Alfred.
	10	John A. Dent	Rockland.
		Frs. Menard	Clarence Creek.
	11	E. M. Casselman	Casselman.
Prince Edward	1	A. M. Buchanan	Picton.
	2	Marshall Palen	Milford.
	3	George Farrell	Demorestville.
	4	A. Harvey	Ameliasburg.
	5	Chas. Herrington	Wellington.
	6	Alex. McDonald	Hallowell.
	7	Harman W. Weeks	Consecon.
	8	E. A. Williams	Waupoose.

List of Division Court Bailiffs, etc.—*Continued.*

County.	No. of Division.	Name of Bailiff.	Post Office Address.
Rainy River	1	W. H. McKay	Rat Portage.
	2	Wm. Niel	Fort Francis.
Renfrew	1	George Mitchell	Pembroke.
		James Millar	Pembroke.
	2	A. Acheson	Westmeath.
	3	S. O'Gorman	Renfrew.
	4	Wm. Wilson	Arnprior.
		John Lyon	Arnprior.
	5	John Hughes	Dacre.
	6	Hugh Gallagher	Eganville.
	7	George Marshall	Cobden.
	8	John Hartney	Rockingham.
Simcoe	1	John Weaymouth	Barrie.
	2	L. Algeo	Bradford.
	3	G. A. Nolan	Tottenham.
	4	A. W. S. Cunningham	Collingwood.
	5	James Martin	Hillsdale.
	6	J. G. Wilson	Orillia.
	7	John Orr, jr	New Lowell.
	8	W. H. McDougall	Alliston.
	9	A. Smeath	Penetanguishene.
	10	Thomas Blaney	Coldwater.
Stormont, Dundas and Glengarry	1	J. A. Robertson	Lancaster.
	2	Colin A. McLauren	Dalkeith.
	3	D. McDonald	Cornwall.
		Homer Stiles	Cornwall.
	4	H. Bush	Lunenberg.
		Simon Warner	Osnabruck Centre.
	5	Jacob Hopper	Morrisburg.
	6	Wm. A. Coons	Iroquois.
	7	Edward Barclay	Inkerman.
	8	Samuel Dillobough	Crysler.
	9	Wm. Cameron	Lancaster.
	10	A. Stallmayer	Chesterville.
	11	Martin Malony	Monckland.
	12	Colin A. McLaurin	Dalkeith.
Thunder Bay	1	John H. Woodside	Port Arthur.
	2	Joseph McKinnon	English River.
	3	J. T. Campbell	Fort William.
Victoria	1	Malcolm McMillan	Eldon Station.
	2	George Manning	Fenelon Falls.
	3	Thomas Cheetham	Bobcaygeon.
	4	Wm. Glass	Omemee.
	5	John Matthie	Lindsay.
	6	Wm. Henry McLaughlin	Oakwood.
	7	William Boden	Victoria Road.
Waterloo	1	J. Klippert	Berlin.
	2	John Kirkpatrick	Galt.
	3	John Kirkpatrick	Galt.
	4	Alex. Fraser	New Hamburg.
	5	Benj. J. Ballard	Hawkesville.
	6	Benj. J. Ballard	Hawkesville.
	7	Ed. Bourchier	Washington.

List of Division Court Bailiffs, etc.—*Continued.*

County.	No. of Division.	Name of Bailiff.	Post Office Address.
Welland	1	Casper Ramey	Welland.
	2	Elston Priestman	Marshville.
	3	J. Teal	Bertier.
	4	J. D. Fralick	Niagara Falls, South.
	5	Lanson Theal	Thorold.
	6	A. Boyor	Port Colborne.
Wellington	1	P. Spragge	Guelph.
	2	J. H. Doughty	Aberfoyle.
	3	Wm. Hemstreet	Acton.
	4	Wm. M. Frank	Fergus.
	5	James Broddy	Erin.
	6	Wm. Findlay	Elora.
	7	S. B. Trask	Glenallen.
	8	David T. Small	Arthur.
	9	James McQuarrie	Orangeville.
	10	Henry Torrance	Harriston.
	11	A. Godfrey	Mount Forest.
Wentworth	1	Wm. Hunter	Hamilton.
	2	F. P. Hanes	Dundas.
	3	Robert W. Job	Waterdown.
	4	Emerson Clement	Troy.
	5	Horace A. Combs	Stoney Creek.
	6	F. P. Hanes	Dundas.
	7	A. de C. Boyes	Binbrook.
	8	Horace A. Combs	Stoney Creek.
	9	J. Greenfield	Hamilton.
York	1	J. M. Wingfield	Parkdale.
		St. John Severs	Toronto.
	2	James Stewart	Toronto.
	3	James Stewart	Toronto.
	4	Wm. Malloy	Newmarket.
		Amos. H. Wilson	
	5	R. A. Sheppard	Sutton West.
	6	James W. Crossley	Lloydtown.
	7	James Stewart	Toronto.
	8	James Stewart	Toronto.
	9	W. Luke	West Hill.
	10	Peter Small	Toronto.

TABLE D.

DIVISION COURTS AND THE LIMITS OF THE RESPECTIVE DIVISIONS IN THE PROVINCE OF ONTARIO.

DISTRICT OF ALGOMA.

1.—Bounded west by Thunder Bay District, 85th parallel of west longitude, and east by Barr River, including all the islands in front.

2.—Bounded west by Barr River, and east by the westerly boundary of the Townships of Thessalon River, Kirkwood, Bridgeland and Houghton, and by said boundary line of the last three named townships, produced northerly.

3.—Bounded west by the westerly boundary of the townships of Thessalon River, Kirkwood, Bridgeland and Houghton, and the boundary line of the last named three townships, produced northerly, and on the east by the eastern boundary of the District.

6.—Consisting of St. Joseph's Island.

COUNTY OF BRANT.

1.—The City of Brantford, and that part of the Township of Brantford not included in the other Divisions hereinafter described. The Townships of Onondaga and Tuscarora, and that part of the Township of Brantford lying south of the main road from Brantford to Hamilton and east of Fairchild's Creek.

2.—The Town of Paris, and that part of South Dumfries west of the line between lots 18 and 19, and that part of the first concession of the Township of Brantford lying west of a continuation of the last mentioned line.

3.—The remainder of the Township of South Dumfries and of the first concession of the Township of Brantford.

4.—The ten northern concessions of the Township of Burford, and that part of the 2nd, 3rd, 4th and 5th concessions of the Township of Brantford, west of the line between lots number 10 and 11, and that portion of the Kerr Tract west of a continuation of the last mentioned line.

5.—The Township of Oakland, the four southern concessions of the Township of Burford, and lots numbers 1 to 5, inclusive, in the ranges east and west of the Mount Pleasant Road, in the Township of Brantford, adjoining the Township of Oakland.

COUNTY OF BRUCE.

1.—The Town of Walkerton, and the Township of Carrick, and all the Township of Brant south of the line between the 11th and 12th concessions.

2.—The Village of Teeswater, all the Township of Culross, and that part of the Township of Greenock lying south of the line between the 11th and 12th concessions and Village of Lucknow, and all of Kinloss Township not in number nine.

3.—The Town of Kincardine and that part of the Township of Kincardine lying south of a line drawn between the 9th and 10th concessions.

4.—The Village of Paisley and that part of the Township of Brant lying north of a line drawn between the 11th and 12th concessions of the Township of Brant.

All the Township of Elderslie, except lots 16 to 36, both inclusive, in concessions 12, 13 and 14 of said Township.

All the Township of Greenock lying north of a line drawn between concessions 11 and 12 of said Township.

Lots 26 to 35, both inclusive, in the 8th, 9th, 10th, 11th, 12th, 13th and 14th concessions of the Township of Bruce; and that part of the Township of Saugeen lying east of a line between lots 28 and 29, and south of the production of the town line between the Townships of Arran and Elderslie to the Saugeen River.

5.—All Saugeen Township not included in No. 4, all that part of the Township of Arran lying west of a line between lots 10 and 11 and north of Arran Lake and the outlet of said lake, and that part of the Township of Amabel lying south of the 10th concession of Amabel, and the Villages of Port Elgin and Southampton.

6.—The Village of Tiverton, and that portion of Kincardine Township north of a line drawn between concessions 9 and 10 in said Township, and all the Township of Bruce, except that part included in No. 4.

7.—That part of the Township of Elderslie not included in No. 4, and that part of Arran Township not included in No. 5, and the Village of Tara.

8.—The Village of Wiarton, the Township of Albermarle, and that part of the Township of Amabel lying north of a line between the 9th and 10th concessions.

9.—All the Township of Huron, and that part of the Township of Kinloss, described as follows:—

Commencing at the boundary line between said Townships of Huron and Kinloss, at a point at which the blind line between the 12th concession of said Township of Kinloss

and the third range south of the Durham Road, in the said Township of Kinloss commences; thence in an easterly direction along said blind line to the westerly side of the Goderich Gravel Road, or the 10th side line of said Township of Kinloss; thence along said 10th side line in a southerly direction to the boundary line of the County of Huron; thence in a westerly direction along said last mentioned boundary to the said line between Huron and Kinloss aforesaid; thence northerly along said last named boundary line to the place of beginning.

10.—All the Townships of Eastnor, Lindsay and St. Edmunds.

COUNTY OF CARLETON.

1.—Comprising all the City of Ottawa, and the Township of Gloucester, to lot 15, inclusive, Rideau front and concessions 1 to 6, inclusive, Ottawa Front and the islands in the Ottawa River opposite thereto.

2.—All the Township of Goulbourn; the 8th, 9th and 10th concessions of the Township of Marlborough; all that portion of the Township of Nepean, south of the River Goodwood; and the 4th, 5th and 6th concessions thereof, north of the same River to the boundary line between lots 20 and 21 in the last mentioned concessions.

3.—All the Township of Huntley, and all the Township of March, except lots 1 to 5, inclusive, in concessions 1, 2, 3 and 4 thereof.

4.—All the Townships of Fitzroy and Torbolton.

5.—All the Township of North Gower; Long Island in the Rideau River and the 1st, 2nd, 3rd, 4th, 5th, 6th and 7th concessions of the Township of Marlborough.

6.—All the Township of Osgoode; the 6th, 7th and 8th concessions Ottawa front and from lots 16 to 30, inclusive of the Rideau front of the Township of Gloucester.

7.—All the Township of Nepean, except the City of Ottawa, and the part of the said Township lying south of the River Goodwood, and concessions 4, 5 and 6, north of said River Goodwood to the boundary line between lots 20 and 21 in said last mentioned concessions, and including also lots 1 to 5, inclusive, in concessions 1, 2, 3 and 4, in the Township of March.

COUNTY OF DUFFERIN.

1.—The Town of Orangeville, the Township of East Garafraxa, and all that portion of the Township of Amaranth lying south of the southerly boundary of lot number 26, in each concession of the Township of Amaranth.

2.—The Village of Shelburne, the Township of Melancthon, and all that portion of the Township of Amaranth lying north of the southerly boundary of lot number 26, in each concession of the Township of Amaranth.

3.—The Township of Mulmur.

4. The Township of Mono.

5. The Township of East Luther.

COUNTY OF ELGIN.

1.—The Townships of Bayham, Malahide and South Dorchester.

2.—The Townships of Southwold and Yarmouth (except the City of St. Thomas).

3.—The City of St. Thomas.

4.—The Townships of Aldborough and Dunwich.

COUNTY OF ESSEX.

1.—Town of Sandwich and Township of Sandwich West.

2.—Town of Amherstburgh and Townships of Malden and Anderdon.

3.—The Village of Kingsville, and all that part of the Township of Gosfield not included in Division No. 8.

4.—The Township of Colchester South, and all that part of Colchester North, south of the 9th concession, exclusive of the said concession and the lots on both sides of Malden Street.

5.—Township of Mersea and Village of Leamington.

6.—The Township of Rochester, the Village of Belle River, the first concession of the Township of Maidstone, and all north of the Middle Road in said Township of Maidstone.

7.—Town of Windsor, the Town of Walkerville, and all that part of Sandwich East, north of the Talbot Street range.

8.—The Town of Essex, all that part of the Township of Maidstone lying west of the first concession and south of the Middle Road; so much of Sandwich East as is south of Talbot Street, including the lots on both sides of said street to Nos. 306 and 307; all of Colchester north of the 9th concession, including said concession and lots on both sides of Malden Street, and all that part of Gosfield lying north of concession 6, and extending as far east from the limits between Gosfield and Colchester as lot No. 12, including such lot in each concession north of concession 6, inclusive.

9.—The Township of Tilbury West.

COUNTY OF FRONTENAC.

1.—City of Kingston, Township of Garden Island, Wolf Island, Howe Island and part of the Township of Pittsburg.

2.—Cataraqui, comprising the Township of Kingston and the Village of Portsmouth.

3.—Loughboro', comprising the Townships of Loughboro' and Bedford.

4.—Verona, comprising the Townships of Portland and Hinchinbrooke.

5.—Sunbury, comprising the Township of Storrington and part of the Township of Pittsburg.

6.—Comprising the Townships of Kennebec, Olden, Oso, Barrie, Clarendon, Palmerston, Miller, North Canonto and South Canonto.

COUNTY OF GREY.

1.—The Town of Owen Sound; the Village of Brook; and the Townships of Derby, Keppel, Sarawak and Sydenham.

2.—The Town of Durham, the Township of Egremont, and those portions of the Townships of Bentinck, Normanby and Glenelg, as follows:—That part of the Township of Bentinck lying east of the line between lots 30 and 31 in the 1st, 2nd and 3rd concessions south of the Durham Road, and in concessions 1, 2, and 3, north of the Durham Road, and east of the line between lots 15 and 16 in concessions 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14 and 15 thereof. That part of the Township of Normanby lying east of the line between lots 20 and 21, in the 4th, 5th, 6th, 7th, 8th, 9th, 10th, 11th, 12th, 13th, 14th, 15th, 16th, 17th and 18th concessions, and all of the Township of Glenelg, excepting that portion lying east of the line between lots 10 and 11 in the 7th, 8th, 9th, 10th, 11th, 12th, 13th, 14th and 15th concessions thereof.

3.—The Town of Meaford, the Township of St. Vincent and that part of the Township of Euphrasia, lying west of the line between the 6th and 7th concessions, and north of the line between lots 15 and 16.

4.—The Township of Collingwood, and the east half of the Township of Euphrasia, excepting that part thereof lying west of the line between the 4th and 5th concessions, and south of the lots between lots 12 and 13, and east half of the Township of Osprey.

5.—The Township of Proton, the west half of the Township of Osprey, and those parts of the Township of Artemesia, consisting of the ranges of lots lying parallel to the Toronto and Sydenham Road, and south of the line between lots 130 and 131, and concessions 1, 2 and 3, south of the Durham Road, and 1, 2, 3, 4, 5 and 6 north of the said Durham Road, and those portions of concessions 7, 8 and 9 lying east of the ranges of lots parallel with the Toronto and Sydenham Road, and those portions of concessions 10, 11, 12, 13 and 14 lying east of the line between lots 30 and 31.

6.—The Township of Sullivan and the Township of Holland, excepting those portions of concessions 9, 10, 11 and 12, lying south of the line between lots 15 and 16, and those portions of concessions 7 and 8 west of the ranges of lots lying parallel with the Toronto and Sydenham Road, and the ranges of lots lying parallel with the Toronto and Sydenham Road, and south of the line between lots 50 and 51.

7.—All the lots from 1 to 30, inclusive, in the three concessions south, and the three concessions north of the Durham Road, in the said Township of Bentinck; and all the lots from 1 to 15, inclusive, in the 12th concession, from the 4th to the 15th concessions, inclusive, of the said Township of Bentinck; and all the lots from 1 to 20, inclusive, in all the concessions from 4 to 18, inclusive, in the Township of Normanby aforesaid.

8.—All the lots from 51 to 130, inclusive, in all the concessions parallel to (and being north-east and south-west), of the Toronto and Sydenham Road, in the Townships of Artemesia, Glenelg and Holland aforesaid; all lots to the westward of the dividing line between lots 30 and 31, in all the concessions from 10 to 14, inclusive, and all the lots from 1 to 5 in the 7th, 8th and 9th concessions, inclusive, which lie to the south-west of the 3rd concession, south-west of the said Toronto and Sydenham Road, in the said Township of Artemesia; all the lots from 1 to 12, inclusive, in concessions 5 and 6, and the lots from 1 to 15, inclusive, in the concessions from 7 to 12, inclusive, in the

Township of Euphrasia; all lots south of the allowance for road between lots 15 and 16 in the 9th, 10th, 11th and 12th concessions, and from lot 25 to lot 30, inclusive, in the 7th concession, and lots 28, 29 and 30 in the 8th concession of the said township of Holland; and all the lots lying east of the allowance for road between lots 10 and 11, in all the concessions from 7 to 15, inclusive, in the said Township of Glenelg.

COUNTY OF HALDIMAND.

1.—All the Township of Seneca, except the first and second concessions, the Young Tract, and the property of the late Richard Martin, and the late Robt. Weir; all the Township of Oneida, except the first range north of the Cayuga line; the Dennis Tract and the lots southerly of said tract.

2.—The whole of the Township of North Cayuga, except that portion thereof lying north-east of side line between lots 12 and 13; the first and second concessions of the Township of Seneca, excepting that portion thereof lying north-east of the side line between lots 12 and 13; the Young Tract, and the lands of the late Robert Weir and the late Richard Martin, Esquires; the first range of Oneida and north of Cayuga line; also the Dennis Tract and river lots lying south.

3.—The Townships of Moulton, Sherbrooke and Dunn, including the Village of Dunnville.

4.—The Townships of South Cayuga and Rainham.

5.—The Township of Canboro, and those portions of North Cayuga and Seneca not included in the other divisions.

6.—The Township of Walpole.

COUNTY OF HALIBURTON.

1.—The Township of Glamorgan, except that portion in the 3rd Division, the Townships of Snowden, Lutterworth, Minden, Anson, Stanhope, Hindon, Sherbourne and McClintock.

2.—The Townships of Dysart, Guilford, Havelock, Livingstone, Lawrence, Eyre, Harburn, Dudley, Monmouth, except that portion in the 3rd Division, the Townships of Harcourt, Bruton, Clyde and Nightingale.

3.—The Township of Cardiff, the Township of Monmouth (except lots 1 to 19 inclusive) in the 13th, 14th, 15th, 16th and 17th concessions; the south 12 concessions of the Township of Glamorgan, and from lots 2[illegible] inclusive, to the eastern boundary in the south six concessions of Snowden.

COUNTY OF HALTON.

1.—All the territory comprised in new survey of the Township of Trafalgar, and the first ten lots in concessions 1, 2 and 6, in the Township of Esquesing, and the first five lots in concessions 7, 8, 9 and 10 in said township.

2.—That part of the Township of Trafalgar known as the Old Survey.

3.—All the rest of the territory comprised in concessions 8, 9, 10 and 11 in the Township of Esquesing, not comprised in the first division.

4.—All the rest of the territory comprised in concessions 1, 2, 3, 4, 5 and 6, in the Township of Esquesing.

5.—The Township of Nassagaweya.

6.—The Township of Nelson.

COUNTY OF HASTINGS.

1.—To comprise the City of Belleville.

2.—To comprise all that part of the Township of Sidney which lies east of the line between lots Nos. 6 and 7 in the several concessions, and south of the 9th concession.

3.—The Township of Tyendinaga, except that part called Deseronto.

4.—The Township of Hungerford.

5.—All that part of the Township of Sidney which lies to the north of the 8th concession, and to the east of lot No. 6 in each concession north of the 8th concession, and all that part of the Township of Rawdon which lies to the south of the 9th concession, and that part of the Township of Huntingdon south of the 6th concession.

6.—The Townships of Madoc, Tudor, Limerick, excepting that part lying north of the 10th concession, and also that part lying west of lots 25 in the different concessions south of the 11th concession of said Township, and including all that part of the Township of Huntingdon north of the 6th concession of said Township.

7.—The Village of Deseronto.

8.—The Township of Thurlow.

9.—The Town of Trenton, and all that part of the Township of Sidney which lies to the west of Lot No. 7 in each of the concessions of the said Township, including Mill Island.

10.—The Townships of Marmora, Lake, and all that part of the Township of Rawdon which lies to the north of the 8th concession.

11.—The Townships of Elzevir, Grimsthorpe, Cashel, excepting that part of Cashel lying north of the 10th concession of the said Township.

12.—The Townships of Wollaston, Faraday, Herschel, McClure, Wicklow, Bangor, Carlow, Monteagle, Dungannon, Mayo, and all that part of the Township of Cashel lying north of the 10th concession of said Township, and all those parts of the Township of Limerick lying north of the 10th concession, and west of lot No. 25 in the several concessions of the said Township of Limerick.

COUNTY OF HURON.

1.—Comprising that part of the Township of Goderich to the north of the Cut Line and the Huron Road until the same meets the road allowance between the 13th and 14th concessions; then by [illegible] the Huron Road to its junction with the Cut Line; then west by the road allowance between concessions 11 and 12 to the River Maitland; then along the River Maitland to Goderich, together with the Township of Colborne.

2.—Comprising the Township of McKillop, the Town of Seaforth, and all that portion of the Township of Tuckersmith not included in the Third Division.

3.—Comprising the Township of Hullett; that part of the Township of Goderich not included in Nos. 1 and 7; 1st, 2nd, 3rd and 4th concessions Township of Stanley; 1st

and 2nd concessions Township of Tuckersmith, L. R. S., north of lot 15, and that portion west of side road between lots 25 and 26, H R. S.; and Town of Clinton.

4.—Comprising the Township of Grey ; all of the Township of Morris, east of side road between lots numbers 10 and 11 ; and the Village of Brussels.

5.—Comprising the Townships of Usborne and Stephen, the first four concessions of the Township of Hay, and the Village of Exeter.

6.—Comprising the Townships of West Wawanosh and Ashfield.

7.—Comprising the Township of Goderich south of Cut Line and Huron Road until the same joins the road between the 13th and 14th concessions of the Township of Goderich ; thence along the said concession until the same joins the River Bayfield ; all Stanley not included in number 3 ; all Hay not included in number 5, and the Village of Bayfield.

8.—Comprising the Village of Wingham, the Townships of Turnberry and East Wawanosh, all the Township of Morris not included in number 4, and the Village of Blyth.

9.—Comprising the Township of Howick and the Village of Wroxeter.

10.—Comprising the Township of Hay.

11.—Comprising the Township of Stephen.

COUNTY OF KENT.

1.—The First Division to consist of the Town of Chatham and that part of the Townships of Dover East and West to the south of the 12th and 13th concession line of the Township of Dover East ; and that part of the Township of Chatham south of the 12th and 13th concession line, and west of the side road between lots 12 and 13, from the first mentioned 12th and 13th concession line to the 5th and 6th concession line, and all south of the said 5th and 6th concession line of said Township ; that part of the Township of Harwich north of 5th and 6th concession line by the eastern boundary ; that part of the Township of Raleigh north of the 16th concession to the west side road between lots 12 and 13 north to the 6th and 7th concession line, and all of the said Township north of the said last mentioned line, and that part of the Township of Tilbury East north of the 4th concession.

2.—The Second Division to consist of that part of the Township of Howard south of the 2nd and 3rd concession line by the eastern boundary (known as the Botany Road), and that part of the Township of Orford south of the 10th and 11th concession line of said Township.

3.—The Third Division to consist of all that part of the Gore of Camden lying west of the 10th and 11th concession line, and that part of the Township of Camden lying west of the side line, between lots 6 and 7 ; the Village of Dresden, and that part of the Township of Chatham, north of the 5th and 6th concession line, and east of the side road between lots 12 and 13.

4.—The Fourth Division to consist of that part of the Township of Harwich south of the 5th concession of the eastern boundary, and south of the 3rd concession by the

western boundary, and that part of Raleigh south of the 15th concession and east of the side road between lots 12 and 13, and the road to the lake shore through lot 146 on the Talbot road.

5.—The Fifth Division to consist of the Village of Wallaceburg, the Gore of Chatham, and that part of the Township of Chatham north-west of the 12th and 13th concession line and west of the side road between lots 12 and 13, and that part of Dover East lying north of the 12th and 13th concession side road.

6.—The Sixth Division to consist of that part of the Township of Howard, north of the Botany Road aforesaid, and of that part of the Township of Orford north of the 10th and 11th concession line, the Township of Zone, the Town of Bothwell, the Village of Thamesville, and that part of the Gore of Camden east of the 10th and 11th concession line, and that part of the Township of Camden east of the side line between lots 6 and 7.

7.—The Seventh Division to consist of that part of Tilbury East south of the 3rd concession, the Township of Romney, and that part of the Township of Raleigh, south of the 6th and 7th concession line and west of the side road between lots 12 and 13 in the said Township, and the road through lot 147 on Talbot road.

COUNTY OF LAMBTON.

1.—The external boundaries of the Township of Sarnia.

2.—The external boundaries of the Township of Warwick.

3.—The external boundaries of the Townships of Euphemia and Dawn.

4.—The external boundaries of the Township of Sombra.

5.—The external boundaries of the Township of Plympton.

6.—The external boundaries of the Township of Bosanquet.

7.—The external boundaries of the Township of Moore.

8.—The external boundaries of the Township of Enniskillen.

9.—The external boundaries of the Township of Brock.

COUNTY OF LANARK.

1.—The Townships of Drummond, Bathurst, South Sherbrooke, Burgess North, and that part of the Township of Elmsley North, north of the Rideau River, within the County of Lanark and west of lot No. 12 in each concession.

2.—The Townships of Lanark, Dalhousie, Darling, Lavant and North Sherbrooke

3.—The Township of Beckwith, and the first six lots in the first seven concessions of the Township of Ramsay.

4.—The Township of Montague, and that part of the Township of North Elmsley from lot No. 1 to lot No. 12 in each concession, both inclusive.

5.—The Township of Pakenham.

6.—The Township of Ramsay, with the exception of the first six lots on the first seven concessions of the said township.

UNITED COUNTIES OF LEEDS AND GRENVILLE.

1.—To consist of the 1st, 2nd, 3rd, 4th, 5th, 6th and 7th concessions and broken front of the Township of Elizabethtown, and the concession roads between them.

2.—To consist of the 1st, 2nd, 3rd, 4th and 5th concessions, and broken front, and that part of the 6th, 7th and 8th concessions from the town line of Edwardsburgh, to lot number 18; inclusive of the Township of Augusta, and the concession roads between them.

3.—To consist of the 1st, 2nd, 3rd, 4th and 5th concessions and broken front, of the Townships of Leeds and Lansdowne, respectively, and the concession roads between them.

4.—To consist of the Township of South Gower, the Township of Oxford, from the west side line of lot numbers 11 in all the concessions of the eastern boundary of the township, and the gore of land between South Gower, Oxford and Edwardsburgh.

5.—To consist of the Township of Wolford (except the 7th and 8th concessions and the allowance of road between them), lots numbers 1 to 10, inclusive, in the 1st, 2nd, 3rd, 4th, 5th, 6th, 7th and 8th concessions of the Township of Oxford, and the allowance of roads within and between them.

6.—To consist of the Townships of Bastard and Burgess, and those parts of the Townships of Leeds and Landsdowne, on the north side of the rear of the 5th concession in each respectively.

7.—To consist of the Townships of Kitley and Elmsley.

8.—To consist of the Townships of North Crosby and South Crosby.

9.—To consist of that part of the Townships of Escott and Yonge, in rear of the 4th concession of Yonge, and in the rear of the 6th concession of Escott; that part of the Township of Elizabethtown, in rear of the 7th concession, and west of lot number 18 in the 8th, 9th, 10th and 11th concessions, and the allowances for roads embraced therein.

10.—To consist of the Township of Edwardsburgh.

11.—To consist of that part of the Township of Augusta, in rear of 5th concession, and west of lots numbers 18, in the 6th, 7th and 8th concessions; the whole of the 9th and 10th concessions of the Township of Augusta; the Gore between the Townships of Oxford, Wolford and Augusta; that part of the Township of Elizabethtown in rear of the 7th concession, and east of the commons, between lots numbers 18 and 19 in the 8th 9th and 10th concessions; the 7th and 8th concessions of the Township of Wolford; lots numbers 1 to 10, inclusive, in the 9th and 10th concessions of the Township of Oxford; and the allowances for roads embraced therein.

12.—To consist of the 1st, 2nd, 3rd and 4th concessions and broken front of the Township of Yonge; the 1st, 2nd, 3rd, 4th, 5th and 6th concessions and broken front of the Township of Escott, and the allowances for roads embraced therein.

The said 1st, 2nd, 3rd and 12th divisions shall, respectively, embrace and comprehend within their limits those portions of the River St. Lawrence, and Islands therein, within the exterior side lines of which such portions of said river and islands would lie and be, if such exterior side lines were produced and extended in that direction to the utmost limits of the Province.

COUNTY OF LENNOX AND ADDINGTON.

1.—The Town of Napanee; Township of Richmond; all that part of North Fredericksburg and Adolphustown lying north of Hay Bay; and all that part of North Fredericksburg lying north of Big Creek.

2.—Comprises 1st concession of Ernestown, the Village of Bath, the Township of Amherst Island, and the 2nd, 3rd and 4th concessions of the said Township of Ernestown, from the west limits thereof to the west limit of lot No. 21, in each concession.

3.—Township of South Fredericksburg and all that part of North Fredericksburg and Adolphustown, not included in Division No. 1.

4.—1st, 2nd and 3rd concessions of the Township of Camden and the Village of Newburg.

5.—All that part of the Township of Camden, not included in Division No. 4.

6.—All that portion of the Township of Ernestown, not included in the limits of Division No. 2.

7.—Townships of Sheffield, Kaladar, Anglesea, Abinger, Effingham, Ashby and Denbigh.

COUNTY OF LINCOLN.

1.—The Town and Township of Niagara.

2.—The Township of Grantham (including the City of St. Catharines, the Villages of Merriton and Port Dalhousie), and the Township of Louth.

3.—The Townships of Caistor and Gainsborough, and the 9th concession of the Township of Grimsby, including the 1st and 2nd ranges as part of the said concession.

4.—The Villages of Grimsby and Beamsville; the Township of Clinton and the Township of Grimsby, except the 9th concession and 1st and 2nd included as part of the said 9th concession.

DISTRICT OF MANITOULIN.

1.—The Town of Gore Bay, the Townships of Gordon, Allan, Campbell Mills, Burpee, Robinson, Dawson, the islands known as Cockburn, Barrie, Clapperton and the Duck Islands, and that part of the township of Billings lying west of the road allowance between lots fifteen and sixteen in the several concessions thereof and so much of the Township of Carnarvon as lies west of Lake Mindemoya and north of the line between the sixth and seventh concessions thereof.

2.—The Town of Little Current, the Township of Howland, and those parts of the Townships of Sheguindah and Bidwell lying north of the line between the sixth and seventh concessions of Sheguindah, and fourth and fifth concessions of the township of Bidwell, and the sixth and seventh concessions of the line between lots seventeen and eighteen in the Township of Billings and the adjacent islands lying north and east of the said Townships, except the Clapperton island.

3.—Manitowaning, the Townships of Assiginack, Tehkummah and Sandfield, and those parts of the Township of Sheguindah lying south of the line between the sixth and seventh concessions of Sheguindah, and fourth and fifth concessions of the Township of Bidwell, and the sixth and seventh concessions of the Township of Billings to the line between lots seventeen and eighteen of said Township, and the Township of Carnarvon, except so much of the same as lies west of Mindemoya Lake, and all that part of Manitoulin lying east of the Township of Assiginack, Manitowaning and South Bays and the islands adjacent thereto.

COUNTY OF MIDDLESEX.

1.—That part of the City of London lying to the west of Maitland street, with that portion of the Township of London lying south of the line between the 4th and 5th concessions and west of the said street, produced northerly or a line in the same direction

to the line between the said 4th and 5th concessions, and with that portion of the Township of Westminister lying west of the main road leading south from Clarke's Bridge across the Thames; south to the line between the 1st and 2nd concessions; and westerly to the line between lots 42 and 43, and extending northerly to the River Thames; and also including the Village of London West.

2.—The Villages of Parkhill and Ailsa Craig, the Townships of East Williams and West Williams, and that portion of the Township of Lobo lying north of the line between the 11th and 12th concessions; and east of the line between lots numbers 12 and 13.

3.—The Townships of McGillivray and Biddulph, and the Village of Lucan.

4.—The Township of Delaware, with that portion of the Township of Westminster west of the line between lots 30 and 31, in the second concession; then southerly on the line between lots 20 and 21, to the southerly limit of the Township, including all west of said line; and also including all that portion of the front of said Township of Westminister, lying west of the line between lots numbers 42 and 43, not included in the first division; with that portion of the Township of Caradoc lying south of the line, between the 5th and 6th concessions, to the River Thames; and with that portion of the Township of Lobo, lying south of the line, between the 6th and 7th concessions, to the River Thames.

5.—The Townships of Ekfrid and Mosa, including the Villages of Wardsville, Newbury and Glencoe.

6.—Townships of Adelaide and Metcalfe; the Town of Strathroy, with that portion of the Township of Caradoc lying north of the line, between the 3rd and 4th concessions; with that portion of the Township of Lobo which lies north of the 6th concession, and west of the line between lots 12 and 13 of the said Township.

7.—The Township of North Dorchester, north and south of the River Thames; that portion of the Townsh p of West Nissouri which lies south of the line between lots 14 and 15; and with that portion of the Township of Westminister lying south of the line between the 1st and 2nd concessions, and east of the line between lots 30 and 31, in the second concession, and thence east of the line between lots 20 and 21, continued south to the southerly limit of the said Township of Westminister.

8.—All that portion of the Township of London which lies north of the line between the 4th and 5th concessions; that portion of the Township of Lobo which lies north of the line between the 6th and 7th concessions, and east of the line between lots 12 and 13, to the line between the 11th and 12th concessions, and with all that portion of the Township of West Nissouri which lies north of the line between lots numbers 14 and 15.

9.—That part of the City of London lying east of Maitland street; that part of the Township of London lying south of the line between the 4th and 5th concessions, and east of the said street, produced northerly or in a line in the same direction to the line between the said 4th and 5th concessions; and that part of the Township of Westminister lying north of the line between the 1st and 2nd concessions, and east of the main road leading south from Clark's Bridge, across the Thames.

DISTRICT OF MUSKOKA.

1.—The Village of Bracebridge, and the Townships of Macaulay, McLean, Ridout, Monck and Cardwell, concessions 1, 2, 3, 4, 5, 6, 7, 8 and 9 in the Townships of Stephenson, Bruce and Franklin, and that part of the Township of Watt, situated east of lot 21, in the several concessions thereof; and concessions 7, 8, 9, 10, 11, 12 and 13 in the Townships of Muskoka and Draper.

2—The Village of Gravenhurst ; the Townships of Morrison, Ryder and Oakley, and concessions 1, 2, 3, 4, 5 and 6 of the Townships of Muskoka and Draper.

3—The Village of Huntsville ; the Townships of Stisted, Chaffey and Sinclair ; and concessions 10, 11, 12, 13 and 14 in the Townships of Stephenson, Brunel and Franklin.

4—The Townships of Wood, Medora and Humphrey, and that part of the Township of Watt situated west of lot 21 in the several concessions thereof.

DISTRICT OF NIPISSING.

1.—To be composed of the Townships of Springer, Field, Badgerow, Caldwell, Kirkpatrick, Hugel, Rattler, Dunnet, Hagar and Appleby, and all that part of the District of Nipissing which is situated west of the line between the Indian Reserve and the Township of Widdifield, produced north and south, to the boundary of the said District and the east of the eastern boundary of the fourth division.

2.—To be composed of the Townships of Mattawan, Olrig, Calvin, Papineau, Lauder, Pentland, Boyd, Osler, McLaughlin, Canisby, Sabine, Lyell, Airy, Murchison and Robinson, and all that part of the District of Nipissing situated east of the line between the Townships of Bonfield and Calvin, produced south of the provisional County of Haliburton, and east of the line between the Townships of Phelps and Olrig, produced north to the Ottawa River.

3—To be composed of the Townships of Widdifield, Merrick, Mulock, Phelps, Ferris, Bonfield, Boulter, Chisholm, Ballantyne, Wilkes, Biggar, Paxton, Butt, Devine, Hunter, McCraney, Finlayson, Peck, and all that part of the District of Nipissing situated west of the line between the Townships of Phelps and Olrig, produced north to the Ottawa River and east of the eastern boundary of first division.

4.—To be composed of the Townships of McKim, Neelon, Dryden, Awrey, Hawley, Blezard, and all that part of the District of Nipissing which is situated west of the line between the said Township of Awrey and the Township of Hagar, produced north and south to the boundary of the said district.

COUNTY OF NORFOLK.

1.—The Gore of the Township of Woodhouse, and all that part of said Township lying west of the side line between lots 5 and 6, together with that part of the 4th, 5th and 6th concessions lying west of the side line, between lots 12 and 13, including that part of the Town of Simcoe within the same.

2.—The Township of Townsend.

3.—The Township of Windham.

4.—The Township of Middleton.

5.—The Township of Charlotteville.

6.—The Township of Walsingham.

7.—The Township of Houghton.

8.—All that part of the Township of Woodhouse not included in Division No. 1, viz.: all that part of the 1st, 2nd and 3rd concessions lying east of the side line, between lots 5 and 6, and that part of the 4th, 5th and 6th concessions lying east of the said line, between lots Nos. 12 and 13 in said Township.

UNITED COUNTIES OF NORTHUMBERLAND AND DURHAM.

1.—Townships of Cartwright and Darlington, and Town of Bowmanville.

2.—Township of Clarke and Village of Newcastle.

3.—Township of Hope and Town of Port Hope.

4.—Townships of Cavan, Manvers, South Monaghan and Village of Millbrook.

5.—Township of Hamilton and Town of Cobourg.

6.—Townships of Haldimand and Alnwick.

7.—Township of Cramahe and Village of Colborne.

8.—Township of Brighton and Village of Brighton.

9.—Township of Percy and Village of Hastings.

10.—Township of Murray.

11.—Township of Seymour and Village of Campbellford.

COUNTY OF ONTARIO.

1.—Including the Townships of Whitby and East Whitby and the Towns of Whitby and Oshawa.

2.—The Township of Pickering.

3.—The Townships of Reach and Scugog, and the Village of Port Perry.

4.—The Townships of Uxbridge and Scott, and the Town of Uxbridge.

5.—The Township of Brock and the Village of Cannington.

6.—The Township of Thorah, and all that part of the Township of Mara lying south of the line, between the 4th and 5th concessions.

7.—All that part of the Township of Mara, lying north of the line, between the 4th and 5th concessions thereof, and the Township of Rama.

COUNTY OF OXFORD.

1.—Comprising the Town of Woodstock, the Townships of Blanford, East Zorra, East Oxford, and that part of the Township of North Oxford, situated east of lot 16, and that part of West Oxford lying east of lot No. 7, to the Stage Road, thence on the north side of the Stage Road, to where the said road intersects the Township of East Oxford.

2.—Comprises the Township of Blenheim.

3.—Comprises the Township of West Zorra and East Nissouri.

4.—Comprises the Townships of North Norwich and South Norwich and the Village of Norwich.

5.—Comprises all those portions of the Townships of North Oxford and West Oxford not comprised in the 1st Division; the Town of Ingersoll, and those portions of the 1st and 2nd concessions of the Township of Durham west of the Middle Town line.

6.—Comprises the Town of Tilsonburg, and all that portion of the Township of Durham not included in the 5th Division.

DISTRICT OF PARRY SOUND.

1.—The Village of Parry Sound, and the Townships of Foley, McDougall, Cowper and Carling, and all that portion of the District lying to the west of the east boundary of Carling, produced to the French River.

2.—The Townships of McKellar, Croft, Hagerman, Ferguson, and all that portion of the District lying between the east boundary of Ferris and the west boundary of Ferguson, produced to the French River.

3.—Townships of Humphrey, Christie, Monteith and Conger.

4.—Townships of McMurrich, Perry and Armour.

5.—The Townships of Spence, Chapman, Lount, Proudfoot, Bethune and Sinclair.

6.—That Territory bounded on the west by the western boundaries of Townships of Pringle and Patterson, and the western boundary of the Township of Patterson, produced to French River and Lake Nipissing; on the east by the eastern boundary of the District of Parry Sound, and on the south by the southern boundaries of the Townships of Himsworth, Gurd and Pringle.

7.—The Townships of Machar, Laurier, Strong and Joly.

COUNTY OF PEEL.

1.—Town of Brampton, Township of Chinguacousy and northern Division of Township of Toronto Gore.

2.—Village of Streetsville, Township of Toronto, and southern Division of Township of Toronto Gore.

3.—Township of Caledon.

4.—Village of Bolton, Township of Albion.

COUNTY OF PERTH.

1.—To consist of all that part of the Township of North Easthope west of the line, between lots 25 and 26, and south of the road between the 8th and 9th concessions, and all that part of the Township of South Easthope west of the side line, between lots 25 and 26; all that part of the Township of Downie and Gore north and east of the concession line, between the 10th and 11th concessions and the Oxford Road; and all the Township of Ellice from the 1st to the 13th concessions, inclusive.

2.—To consist of all that part of the Township of Fullarton not included in Division No. 3, and the Townships of Hibbert and Logan.

3.—To consist of that portion of the Township of Downie west of the Oxford Road, and south of the concession line between the 10th and 11th concessions; the Township of Blanshard; all that part of the Township of Fullarton comprising the 13th and 14th concessions, and south of a road leading from the Mitchell Road, between lots 24 and 25, east to lot 3 in the 10th concession; thence east along the line between the 10th and 11th concessions to the town line.

4.—To consist of that part of the Township of North Easthope east of the line, between lots 25 and 26, and north of the 8th concession, inclusive, with the 9th and 10th concessions; all that part of the Township of South Easthope not included in Division No. 1.

5.—To consist of the Township of Mornington, and all that part of the Township of Elma from lots No. 53 to 72, both numbers inclusive, of the 1st concession, and from lots No. 27 to No. 36, both numbers inclusive, in and from the second to the eighteenth concessions, both concessions inclusive, of said Township of Elma; and concessions 14, 15 and 16 of the Township of Ellice; and concessions 11th, 12th, 13th and 14th of the Township of North Easthope.

6.—To consist of the Township of Wallace, and all that part of the Township of Elma from the 1st concession to the 18th concession, both concessions inclusive, and comprising lots Nos. 1 to 52, both inclusive, of the 1st concession, and lots No. 1 to No 26 inclusive, from the 2nd to the 18th concessions, both concessions inclusive.

COUNTY OF PETERBOROUGH.

1.—Composed of the Town of Peterborough, the Village of Ashburnham, the Townships of North Monaghan and Ennismore, and all that part of the Township of Harvey lying west of Pigeon Lake and south of Bobcaygeon; and all the Township of Smith lying south of the 7th concession; and all the Township of Otonabee lying west of the 8th concession and north of lots 21 from the said 8th concession to the western boundary of said Township of Otonabee; and all the Township of Duoro lying south of lots numbered 11; and all that part of the Township of Dummer lying south of lots numbered 11 and west of the 5th concession.

2.—Composed of the Townships of Asphodel, Belmont and Methuen, and that part of the Township of Dummer lying east of the 4th concession and south of lots numbered 11.

3.—Composed of all that part of the Township of Otonabee lying east of the 9th concession; and all that part of said Township of Otonabee lying south of lots numbered 22 and west of the 8th concession.

4.—Composed of all that part of the Township of Smith, lying north of the 6th concession; and all that part of the Township of Duoro, lying north of lots numbered 10; and all that part of the Township of Dummer, lying north of lots numbered 10; and also of the Village of Lakefield, and of the Township of Galway; and all the Township of Harvey, except that portion lying west of Pigeon Lake, and south of Bobcaygeon

5.—Composed of the Townships of Burleigh, Cavendish, Anstruther and Chandos.

UNITED COUNTIES OF PRESCOTT AND RUSSELL.

1.—Comprises the whole of the Township of Longueuil, the municipality of the Village of L'Orignal, and the first concession of the Township of Caledonia.

2.—Comprises all that part of the Township of West Hawkesbury, extending from the front of the third concession, to the rear of the said township.

3.—Comprises the whole of the Township of East Hawkesbury.

4.—Comprises the Township of North Plantagenet, and that part of the Township of South Plantagenet, lying north of the Nation River.

5.—Comprises the whole of the Township of Cumberland.

6.—Comprises the whole of the Township of Russell.

7. Comprises the two front concessions of the Township of West Hawkesbury, and the municipality of Hawkesbury Village, within the same.

8.—Comprises the Township of Caledonia (excepting the 1st concession of the said township), and also that portion of the Township of South Plantagenet, lying south and east of the Nation River.

9.—Comprises the whole of the Township of Alfred.

10.—Comprises the whole of the Township of Clarence.

11.—Comprises the whole of the Township of Cambridge.

COUNTY OF PRINCE EDWARD.

1.—The Town of Picton, the 2nd and 3rd concessions "Military Tract," from the west line of lot No. 13, eastward; Gore "G"; 1st and 2nd concessions north of the Carrying Place; 1st concession south-east of the Carrying Place, and 2nd concession north of Black River, including Gore "K" and "L" and McCan Gores, all in the Township of Hallowell; Block "I" the concessions north and east of East Lake and Gore "B" in the Township of Athol, and the 1st and 2nd concessions south of the Bay of Quinte, and Gore "A," in the Township of North Marysburgh, and 1st concession south-west of Green Point, to the end of Carman's Point in Sophiasburg.

2.—The Township of South Marysburgh, and the southern part of Athol, commencing at the outlet of East Lake, thence down to the head of the lake, thence down to the base line between the 1st concession south and the 1st concession north of East Lake, till it strikes the Township line of Hallowell, thence down said township line till it strikes South Marysburgh.

3.—The Township of Sophiasburg, together with Big Island, excepting the 1st concession south-west of Green Point to the end of Carman's Point.

4.—All that part of the Township of Ameliasburgh lying east of the line between lots Nos. 86 and 87, in the 1st, 2nd, 3rd and 4th concessions of said Township, including Hull's Island.

5.—That part of the Township of Hillier not included in the 7th Division, also the 1st and 2nd concessions north of West Lake, and west of lot No. 7 in the said concession, and that part of Irwin Gore lying north of and west of lot No. 7 in the 2nd concession, and the west part of the 2nd concession produced west of lots No. 74, in that concession, in the Township of Hallowell.

6.—Block (IV.) four, concession south side of West Lake, 1st concession "Military Tract," 2nd and 3rd concessions of said Tract west of lots No. 13 in those concessions, Gore "E," 1st and 2nd concessions north of West Lake and east of lot No. 6 in those concessions; the Gerrow Gore and that part of Irwin Gore not included in Division No. 5, and all that part of the 2nd concession produced east of lot No. 75 in the Township of Hallowell.

7.—All that part of the Township of Ameliasburgh lying west of the line between lots Nos. 86 and 87, in the 1st, 2nd, 3rd and 4th concessions of said Township; all that part of the 4th and 5th concessions of the Township of Hillier west of the line between lots Nos. 86 and 87, and the 3rd concession west of the line between lots Nos 22 and 23, with that part of the 2nd concession lying north of Pleasant Bay, in the said Township of Hillier.

8.—All the point lying east of the west line of Marsland's Gore, the concession north of Smith's Bay and Waupoos Island in the Township of North Marysburgh.

DISTRICT OF RAINY RIVER.

1.—That part of the District composed of the territory to the north of the south-easterly shore of the Lake of the Woods, and a line drawn in a north-easterly direction from Rat Portage to the north end of Lake Manitou; thence in an easterly direction to the south end of the lake known as the lake where the river bends; thence in an easterly direction to a point where the said meridian of the most easterly part of Hunter's Island ntersects the Canadian Pacific Railway at the south-west angle of Hawke Lake.

2.—The territory lying south and east of the Lake of the Woods, and of the said line.

COUNTY OF RENFREW.

1.—Comprising the Town of Pembroke, the Townships of Pembroke, Stafford, Alice, Petewawa, Buchanan, Rolph, Wylie, McKay, Fraser, Head, Clara and Maria, and all that part of the Township of Wilberforce from the 18th to the 25th concessions, both inclusive; and also all those parts of the 14th, 15th, 16th and 17th concessions of the same Township of Wilberforce lying north of Snake River and east of Lake Doré.

2.—Comprising all that part of the Township of Westmeath lying east and north of the Muskrat Lake and River, and all those parts of the Township of Ross, from the 5th to the 9th concessions, both inclusive, east of Muskrat Lake, and from the 7th to the 13th (of the other) concessions of Ross, both inclusive, of the said Township of Ross.

3.—Comprising the Village of Renfrew, and the Townships of Horton and Admaston.

4.—Comprising the Village of Arnprior and the Township of McNab.

5.—Comprising the Townships of Bagot, Blythefield, Brougham, and Matawatchan.

6.—Comprising the Townships of Grattan, Sebastopol, South Algona, North Algona, and all that part of the Township of Wilberforce from the 1st to the 17th concessions, both inclusive, excepting those parts of the 14th, 15th, 16th and 17th concessions of same Township of Wilberforce lying north of Snake River and east of Lake Doré.

7.—Comprising the Township of Bromley, and all that part of the Township of Westmeath west of Muskrat Lake, and all those parts of the Township of Ross from the 1st to the 4th concessions, both inclusive, east of Muskrat Lake, and from the 1st to the 6th of the other concessions, both inclusive, of the said Township of Ross.

8.—Comprising the Townships of Brudenell, Radcliffe, Raglan, Lyndoch, Griffith, Hagarty, Sherwood, Jones, Richards and Burns.

COUNTY OF SIMCOE.

1.—Comprising the Town of Barrie, the Township Vespra, except that portion lying west of the Nottawasaga River, and excepting also lots Nos. 38, 39 and 40 in the 1st and 2nd concessions, and lots Nos. 1, 2 and 3 in the 3rd, 4th, 5th, 6th and 7th concessions, respectively. That portion of the Township of Oro lying south of lots Nos. 21 in the 1st and 2nd concessions (including the Ranges), and south of lots Nos. 13 in the 3rd, 4th, 5th, 6th, 7th and 8th concessions, respectively; that portion of the Township of Innisfil lying east of lots Nos. 5 in the 6th, 7th and 8th concessions, and that portion lying north of the 8th concession: that portion of the Township of Essa lying north of lots Nos. 19 in the 7th, 8th, 9th, 10th and 11th concessions.

2.—The Village of Bradford; the Township of West Gwillimbury, excepting therefrom lots Nos. 1, 2, 3, 4 and 5 in the 14th and 15th concessions; the Township of Innisfil except that portion lying north of the 5th concession, and excepting also lots Nos. 1, 2, 3, 4 and 5 in the 1st, 2nd, 3rd, 4th and 5th concessions.

3.—The Township of Tecumseth, except concessions 12, 13, 14 and 15; the Township of Adjala, except that portion lying north of lots Nos. 25 in the 8th concession thereof.

4.—The Town of Collingwood, the Village of Stayner, that portion of the Township of Nottawasaga lying north of lots Nos. 18 in the twelve concessions thereof; that portion of the township of Sunnidale lying north of the 8th concession; that portion of the Township of Flos lying west of the Nottawasaga River; the Islands in Lake Huron contiguous to the Township of Nottawasaga.

5.—The Township of Flos, except that portion lying west of the Nottawasaga River; the Township of Medonte, except that portion lying east of the 10th concession; and north of lots Nos. 10 in the 9th and 10th concessions, respectively; that portion of the Township of Oro, lying north of the southern boundaries of lots Nos. 21 in the 1st and 2nd concessions, and north of the southern boundaries of lots Nos. 13 in the 3rd, 4th, 5th, 6th, 7th and 8th concessions, respectively: lots Nos. 38, 39 and 40 in the 1st and 2nd concessions, and lots Nos. 1, 2 and 3 in the 3rd, 4th, 5th, 6th and 7th concessions of the Township of Vespra.

6.—The Town of Orillia, the Township of Orillia, southern division, the Township of Orillia, northern division, except that portion lying north of lots Nos. 15 in the first seven concessions thereof; that portion of the Township of Oro lying east of the 8th concession; that portion of the Township of Medonte being composed of lots Nos. 1 to 6 (both inclusive) in the 11th, 12th, 13th and 14th concessions; the Islands in Lake Simcoe contiguous to the townships and portions of townships above described lying wholly or for the most part opposite thereto.

7.—The Township of Nottawasaga, except that portion lying north of lots Nos. 18 in the 12th concession thereof; the Township of Sunnidale, except that portion lying north of the 8th concession; that portion of the Township of Vespra lying west of the Nottawasaga River; that portion of the Township of Essa lying north of lots Nos. 19 in the 1st, 2nd, 3rd, 4th, 5th and 6th concessions; that portion of the Township of Tossorontio lying north of lots Nos. 20 in each of the seven concessions thereof.

8.—The Township of Essa, except that portion lying north of lots Nos. 19 in each of the eleven concessions thereof; the Township of Tossorontio, except that portion lying north of lots Nos. 20 in each of the seven concessions thereof; that portion of the Township of Innisfil, being composed of lots Nos. 1, 2, 3, 4 and 5, in the 1st, 2nd, 3rd, 4th, 5th, 6th, 7th and 8th concessions; the 12 h, 13th, 14th and 15th concessions of the Township of Tecumseth; lots Nos. 1, 2, 3, 4 and 5, in the 14th and 15th concessions of the Township of West Gwillimbury; that portion of the Township of Adjala lying north of lots Nos. 25 in the eight concessions thereof.

9.—The Town of Penetanguishene, and the Village of Midland, the Township of Tiny; that portion of the Township of Tay lying west of the 8th concession; the Islands in Lake Huron contiguous to the Township of Tiny, and to that part of the Township of Tay, forming part of the ninth division, and lying wholly or for the most part opposite thereto.

10.—The Township of Matchedash, that portion of the Township of Orillia, northern division, lying north of lots Nos. 15 in the first seven concessions thereof; that portion of the Township of Medonte lying north of lots Nos. 6 in the 11th, 12th, 13th and 14th concessions, and that portion lying north of lots Nos. 10, in the 9th and 10th concessions thereof; The Township of Tay, except that portion lying west of the 8th concession; the Island in Lake Huron, contiguous to that part of the Township of Tay, forming part of the 10th division, and lying wholly or for the most part opposite thereto.

NOTE.—Each of the said several Divisions shall include all allowances for roads embraced within its external limits, and shall also extend to the centre of every allowance for road lying external and adjacent to every such Division, excepting always where any such last-mentioned allowance is hereinbefore declared to belong to or to form part of any particular Division.

UNITED COUNTIES OF STORMONT, DUNDAS AND GLENGARRY.

1.—Township of Charlottenburg, in the County of Glengarry.

2.—Township of Lochiel, in the County of Glengarry.

3.—Town and Township of Cornwall, in the County of Stormont.

4.—Township of Osnabruck, in the County of Stormont.

5.—Township of Williamsburg, in the County of Dundas.

6.—Township of Matilda, in the County of Dundas.

7.—Township of Mountain, in the County of Dundas.

8.—Township of Finch, in the County of Stormont.

9.—Township of Lancaster, in the County of Glengarry.

10.—Township of Winchester, in the County of Dundas.

11.—Township of Roxborough, in the County of Stormont.

12.—Township of Kenyon, in the County of Glengarry.

DISTRICT OF THUNDER BAY.

1.—All that part of the District lying west of the meridian of 87 degrees of west longitude, to the meridian of the most easterly part of Hunter's Island, excepting therefrom the Municipality of Neebing.

2.—

3.—Comprising the Municipality of Neebing.

COUNTY OF VICTORIA.

1.—The first consists of the following townships and parts of townships, viz.: of the 15th concession of the Township of Mariposa, and the Township of Eldon, except the ranges north and south of Portage Road.

2.—The second consists of the following townships: all of the Township of Fenelon, except that portion lying east of the Scugog River, and south of Sturgeon Lake, and the Township of Summerville.

3.—The third consists of the Township of Verulam.

4.—The fourth consists of the Township of Emily.

5.—The fifth consists of the Town of Lindsay, Township of Ops, and that portion of the Township of Fenelon, lying east of the Scugog River, and south of Sturgeon Lake.

6.—The sixth consists of the Township of Mariposa, except the 15th concession.

7.—The seventh consists of the Townships of Carden and Dalton, Laxton, Digby and Longford, and the Township of Bexley, and that portion of the Township of Eldon north of Portage Road, and the Range south of Portage Road.

COUNTY OF WATERLOO.

1.—All that portion of the Township of Waterloo, lying north of Block line on the west side of the Grand River, and that part of the Upper block of said Township, lying on the east side of the Grand River, north of lots Nos. 115, 109, 104, 86 and 95 to the Guelph Township line, including the Towns of Berlin and Waterloo.

2.—All that part of the Township of Waterloo, lying south of the Block Line, on the west of the Grand River, and that part lying on the east side of the Grand River, south of the northern boundary of lots Nos. 115, 109, 104, 86 and 95, to the Guelph Township line, including the Villages of Preston and Hespeler.

3.—All that part of the Township of North Dumfries, lying east of lot No. 19, in the 7th concession; and running a course with the eastern boundary of the said lot in a northerly direction up to the 12th concession; thence along the eastern boundary of lot No. 23, in the said 12th concession to the township line, including the Town of Galt.

4.—The Township of Wilmot, including the Village of New Hamburg.

5.—The Township of Wellesley.

6.—The Township of Woolwich.

7.—All that part of the Township of North Dumfries, lying west of the eastern boundary of said lot No. 18, in the 7th concession; thence along the eastern limits of said lot No. 19, the same course thereof, in a northerly direction to the 12th concession; thence along the westerly limit of lot No. 23, in the said 12th concession, to the township line, including the Village of Ayr.

THE COUNTY OF WELLAND.

1.—Comprising the Township of Crowland; that part of the Township of Thorold, lying south of the line between lots 178 and 195, running through to Pelham; that part of Pelham, lying south of the 4th concession, and that part of Humberstone, lying north of the concession line, between the 4th and 5th concession, being the whole of the 5th concession and the Town of Welland.

2.—Comprising the Township of Wainfleet.

3.—Comprising the Township of Bertie, and those parts of the Township of Humberstone not included in Nos. 1 and 6, and the Village of Fort Erie.

4.—Comprising the Township of Willoughby, the Village of Chippawa, and that part of the Township of Stamford, south of the line between lots 136 and 137; easterly from the western limit of the Township to the south-east angle of lot No. 133; thence north on the line between lots Nos. 132 and 133, to the northern boundary of the township, including the Town of Clifton and Navy Island.

5.—Comprising those parts of the Townships of Stamford, Thorold and Pelham, not included in any other Division, and the Town of Thorold.

6.—Comprising all the Township of Humberstone, lying south of the 5th concession and west of the side lines, between lots Nos. 9 and 10 in the several other concessions thereof, and the Village of Port Colborne.

COUNTY OF WELLINGTON.

1.—The Town and Township of Guelph.

2.—The Township of Puslinch.

3.—The Township of Eramosa.

4.—Consisting of the Township of Nichol, excepting the 11th and 12th concessions; the Municipality of Fergus; the first eight concessions of the Township of Garafraxa, and lots 1 to 18, both inclusive, in concessions A and B of the Township of Peel, lots 13, 14, 15, 16, 17 and 18, in concessions 18 and 19, and lots 19, 20 and 21, in the 17th concession of the Township of Peel.

5.—The Township of Erin.

6.—Consisting of the Township of Pilkington, and the 11th and 12th concessions of the Township of Nichol; the Municipality of the Village of Elora; and lots numbers 19 and upwards belonging to the 9th, 10th, 11th, 12th, 13th, 14th, 15th and 16th concessions of Peel.

7.—Consisting of concessions 1 to 16, inclusive, of the Township of Maryboro', and concessions 1 to 16, both inclusive, of the Township of Peel, except lots 19, 20, 21, 22 and 23 of those concessions in that Township.

8.—Consisting of that part of the Township of Arthur, south and south-east of lot 15, on the west side of the Owen Sound Road; lot 16 on the Owen Sound Road, and lot 12 east of the Owen Sound Road, in the Township of Arthur; that part of the Township of Luther, from lots 1 to 16, both inclusive; and lots 1 to 12, both inclusive, of the 17th and 18th concessions of the Township of Peel; lots 5 to 11, both inclusive, of the 19th concession of said Township of Peel; and lots 19 to 23, both inclusive, of concessions "A" and "B," of said Township of Peel.

9.—The territory formerly comprised in this Division is now in the County of Dufferin.

10.—Consists of the Township of Minto.

11.—Consists of the Town of Mount Forest, and that part of the Township of Arthur north of lot 16, west of the Owen Sound Road; lot 17, on the Owen Sound Road, and lot 13, east of the Owen Sound Road.

COUNTY OF WENTWORTH.

1.—All that part of the Township of Barton lying east of the line between lots 14 and 15, and all that part of Hamilton City east of Hughson Street.

2.—The whole of the Township of Flamboro' West.

3.—The whole of the Township of Flamboro' East.

4.—The whole of the Township of Beverley.

5.—The whole of the Township of Saltfleet.

6.—The whole of the Township of Ancaster.

7.—The whole of the Township of Glanford.

8.—The whole of the Township of Binbrook.

9.—All that part of the Township of Barton, lying west of the line between lots 14 and 15, and that part of Hamilton City west of Hughson Street.

COUNTY OF YORK.

1.—The City of Toronto, east of Yonge Street.

2.—Concessions 5 to 11, inclusive, of the Township of Markham; and concessions 5 to 10, inclusive, of the Township of Whitchurch, from 1 to 10, inclusive, together with the Villages of Markham and Stouffville.

3.—Concessions 1 to 4, inclusive, of the Township of Markham; and concessions 1 to 4, inclusive, of the Township of Whitchurch from lot 1 to 10, inclusive; and concession 1 to 3, inclusive, of the Township of Vaughan.

4.—The Township of Whitchurch, from the line between lots 10 and 11, northward and the Township of East Gwillimbury.

5.—The Townships of Georgina and North Gwillimbury.

6.—The Township of King and the Incorporated Village of Aurora.

7.—Concessions 1 to 11, inclusive, of the Township of Vaughan.

8.—All that portion of the Township of York lying west of Yonge Street, and the Township of Etobicoke.

9.—The Township of Scarboro' and all that portion of the Township of York which lies east of Yonge Street and the Village of Leslieville.

10.—The City of Toronto west of Yonge Street.

DIVISION COURT TARIFF.

Fees to be received by the several Clerks and Bailiffs of Division Courts n Ontario from and after the first day of January, 1885 :—

FORM 133.

SCHEDULE OF CLERKS' FEES.

1. Receiving claim, numbering and entering in Procedure Book..... $0 15
(This item to apply to entering in the Procedure Book a transcript of judgment from another Court, but not an entry made for the issue of a judgment summons.)

2. Issuing summons, with necessary notices and warnings thereon, or judgment summons (as provided in the forms), in all,
Where claim does not exceed $20..... 0 40
" exceeds $20, and does not exceed $60 ..... 0 50
" exceeds $60, and does not exceed $100..... 0 60
" exceeds $100..... 1 00
[*N. B.*—In replevin and interpleader suits the value of goods to regulate the fee.]

3. Copy of summons, including all notices and warnings thereon..... 0 20

4. Copy of claim (including particulars), when not furnished by plaintiff (to be paid by the plaintiff)..... 0 20

5. Copy of set-off (including particulars), when not furnished by the defendant (to be paid by the defendant)..... 0 20

6. Receiving and entering bailiff's return to any summons, writ or warrant issued under the seal of the Court (except summons to witness and return to summons, or papers from another Division)..... 0 15

7. Entering and noting every defence or notice of admission in Procedure Book.. 0 25
(To be paid in the first instance by the defendant or other person entering it, but it may be afterwards taxed against the plaintiff, should costs be given against him).

8. Taking confession of judgment..... 0 10
(This does not include affidavit and oath chargeable under item 9.)

9. Every necessary affidavit, if actually prepared by the clerk, and administering oath to the deponent..... 0 25

10. Copies of papers for which no fee is already provided, necessarily required for service of transmission to the Judge—each..... 0 10

11. Every notice of defence of admission entered, or other notice required to be given by the Clerk to any party to a cause or proceeding, or to the Judge in respect to the same, and mailing..... 0 15

12. Entering final judgment by Clerk on special summons, where claim is not disputed..... 0 50

13. Entering every judgment rendered at the hearing or final order made by the Judge $0 50

(This one fee of 50 cents will include the service of recording at the trial and afterwards entering in the Procedure Book, the judgment, decree and order in its entirety rendered or made at the trial. In a garnishee proceeding before judgment the fee of 50 cents will be allowed for the judgment in respect to the primary debtor, and a like fee of 50 cents for the adjudication, whenever made, in respect to the garnishee.)

14. Subpœna to witness..... 0 15

(The subpœna may include any number of names therein, and only one original subpœna shall be taxed, except the judge otherwise orders.)

15. For every copy of subpœna required for service..... 0 05

16. Summons for each juryman when called by the parties..... 0 10

(Only 25 cents in all to be allowed for returning a Judge's jury.)

17. Every order of reference or order for adjournment made at hearing, and every order requiring the signature of the judge, and entering the same..... 0 25

(Any warning necessary with order—*e.g.*, the warning in form 42—forms part of the order.)

18. Transcript of judgment (under section 161 or 165)..... 0 25

19. Every writ of execution, warrant or attachment, or warrant for arrest of delinquent, and delivering the same to Bailiff..... 0 50

20. Renewal of every writ of execution, when ordered by the judgment creditor.. 0 15

21. Every bond, when necessary, and prepared by the Clerk, (including affidavit of justification)..... 0 50

22. For necessary entries in the Debt Attachment Book in each case (in all)..... 0 20

23. Transmitting transcript of judgment, or transmitting papers for service to another Division, or to Judge on application to him, including necessary entries, but not postage..... 0 25

24. Receiving papers from another Division for service, entering the same, handing to the Bailiff, receiving and entering his return, and transmitting the same, (if returns made promptly, not otherwise) 0 30

(This fee does not include a charge for receiving transcript of judgment, for which a fee of 15 cents is taxable under item 1.)

25. Search by person, not party to the suit or proceeding, to be paid by the applicant, 10 cents; search by party to the suit or proceeding, where service is over one year old.)..... 0 10

(No fee is chargeable for search to a party to the suit or proceeding, if the same is not over one year old.)

26. Taxing costs in defended suits..... 0 25

Rule No. 175 of the Rules of practice of Division Courts.—On payment of a fee of 5 cents, every clerk, when required by parties paying costs, shall give a statement, in writing, of items in detail, or transmit the same by postal card.

FORM 134.

SCHEDULE OF BAILIFF'S FEES.

1.	Service of summons, writ or warrant issued under the seal of the Court, or Judge's summons on each person (except summons to witness and summons to juryman),	
	Where claim does not exceed $20	$0 30
	" exceeds $20, and does not exceed $60	0 40
	" exceeds $60, and does not exceed $100	0 50
	" exceeds $100	0 75
	(In interpleader suits the value of the goods to regulate the fee.)	
2.	For every return as to service of summons, attending at the Clerk's office, and making the necessary affidavit (as provided by Rule 90)	0 15
3.	Service of summons on witness or juryman, or service of notice	0 15
4.	Taking confession of judgment, or attending to prove	0 10
5.	For calling parties and their witnesses at the sittings of the Court, in every defended case, as provided by Rule 91, amended by Rule 168	0 15
6.	Enforcing every writ of execution, or summons in replevin, or warrant of attachment, or warrant against the body—each,	
	Where claim does not exceed $20	0 50
	" exceeds $20, and does not exceed $60	0 75
	" exceeds $60	1 00
	(Executing summons in replevin includes service on defendant. The value of the goods to regulate the amount of the fee.)	
7.	Every mile necessarily travelled to serve summons or process, or other necessary paper, or in going to seize on attachment, or in going to seize on a writ of execution, where money made, or case settled after that levy	0 12
	(In no case is mileage to be allowed for a greater distance than from the Clerk's office to the place of service or seizure.)	
8.	Mileage to arrest delinquent under a warrant to be at 12 cents per mile, but for carrying delinquent to prison, including all expenses, and assistance, per mile	0 20
9.	Every schedule of property seized, attached, or replevied, including affidavit of appraisal, when necessary,	
	Not exceeding $20	0 30
	Exceeding $20, and not exceeding $60	0 50
	Exceeding $60	0 75
10.	Every bond, when necessary, when prepared by the Bailiff (including affidavit of justification)	0 50
11.	Every notice of sale, not exceeding three, under execution or under attachment, each	0 15

12. There shall be allowed to the Bailiff for removing or retaining property seized under execution or attached, reasonable and necessary disbursements and allowances, to be first settled by the Clerk, subject to appeal to the Judge

13. There shall be allowed to the Bailiff five per cent. upon the amount realized from the sale of property under any execution, but such percentage not to apply to any overplus thereon

(But if execution be satisfied in whole or in part, after seizure and before sale, the Bailiff, to be entitled to charge and receive three per cent. on the amount realized.)

(No. 39.)

Return to an Order of the House of the nineteenth day of March, 1891, shewing copies of all correspondence on the subject of preparing or publishing school text-books, with a statement of all sums paid in connection with the preparation or publication of school text-books subsequent to that already brought down, with the award of the arbitrators thereon. Presented to the Legislature 20th March, 1891. Mr. *Preston.* (*Not Printed*).

LABORATORY
AGRICULTURAL COLLEGE
GUELPH,
ONT.
FARM BUILDINGS
PART OF FARM, FROM SOUTH-WEST

SIXTEENTH ANNUAL REPORT

OF THE

ONTARIO AGRICULTURAL COLLEGE

AND

EXPERIMENTAL FARM,

1890.

PRINTED BY ORDER OF THE LEGISLATIVE ASSEMBLY.

TORONTO:
PRINTED, BY WARWICK & SONS, 68 AND 70 FRONT STREET WEST
1891.

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MINISTER OF AGRICULTURE

Hon. John Dryden, Toronto.

Ontario Agricultural College and Experimental Farm Guelph, under control of the Minister of Agriculture.

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SIXTEENTH ANNUAL REPORT

OF THE

ONTARIO AGRICULTURAL COLLEGE

AND EXPERIMENTAL FARM.

GUELPH, January 2nd, 1891.

To the Honourable JOHN DRYDEN,

Minister of Agriculture:

DEAR SIR,—I have the honor to submit herewith the Sixteenth Annual Report of the Ontario Agricultural College and Experimental Farm.

In this Report we have reviewed briefly the work of the year 1890 under the following heads:—

PART I.—REPORT OF THE PRESIDENT.

PART II.—REPORT OF THE PROFESSOR OF GEOLOGY AND NATURAL HISTORY.

PART III.—REPORT OF THE PROFESSOR OF CHEMISTRY.

PART IV.—REPORT OF THE PROFESSOR OF VETERINARY SCIENCE.

PART V.—REPORT OF THE FOREMAN OF THE HORTICULTURAL DEPARTMENT.

PART VI.—REPORT OF THE PHYSICIAN.

PART VII.—REPORT OF THE PROFESSOR OF AGRICULTURE.

PART VIII.—REPORT OF THE ASSISTANT DIRECTOR OF EXPERIMENTS.

PART IX.—REPORT OF THE ASSISTANT IN THE DEPARTMENT OF DAIRYING.

I have the honor to be, sir,

Your obedient Servant,

JAMES MILLS,
President.

PART I.

REPORT OF THE PRESIDENT.

Once more we are called upon to give an account of our stewardship. Another year has gone with its labors, cares, and anxieties; and what shall we say of the results, in so far as they affect our students, ourselves, and the interests of agriculture throughout the Province which we have the honor to represent?

COLLEGE VACATIONS AND FARMERS' INSTITUTES.

It may perhaps seem strange to introduce the question of our college vacations at the outset, and it is scarcely what one would expect in an annual report of the college. But within the last two years a good deal has been said by a few persons upon this question; and less than six months ago a misleading letter on the subject was sent the rounds of the Ontario press, with a view to create the impression that the President of the college was very much to blame, that farmers would not send their sons to the college, and that the interests of Canadian agriculture were suffering, all because of a change which was made in the length of our Christmas vacation six years ago. This letter was professedly written by a farmer, explaining why young farmers would not take a course at the Ontario Agricultural College; but in reality it was written by one who never wrought a month on a farm in his life. Under these circumstances, I think it is proper that I should say a few words by way of explanation and self-defence.

Total Length of Vacations Unchanged.

During all the time of my predecessors in office and for the first five years of my administration, there were three vacations each year, as follows:—

At Christmas	1 month.
At Easter	½ "
At the end of the college year (31st August)	1 "
Total	2 months.

But since the beginning of the year 1885, there have been only two vacations—

At Christmas	1 month.
At the end of the college year (31st August)	1 "
Total	2 months.

Reasons for Changing Vacations.

I was not long in the position which I now occupy, as head of the institution, till I discovered that we (the professors of the college), were not reaching the agriculturists of this Province. The great majority of the farmers were personally unacquainted with the professors. They had heard very unfavorable reports of them; but they knew little or nothing about either their attainments, their conduct, or the work which they were endeavoring to do. This state of things being very undesirable, I naturally sought for some means of bringing the professors and the farmers together. The farmers were quite willing to hear the professors, but the difficulty was to find a time suitable for both. Some of the professors were free in the summer months, but farmers could not attend public meetings at that season of the year; and the farmers had a slack time in January and February, but the professors were then engaged with their college work. So, after considerable thought and deliberation on the part of the Hon. A. M. Ross and myself, it was decided, in the fall of 1884, to abolish the Easter vacation; to add two weeks to the Christmas vacation (making it a month); to organize Farmers' Institutes; and to send the professors throughout the Province to address institute meetings during the last three weeks of the Christmas vacation (2nd to 22nd January inclusive).

Results of Changing Vacations.

By the change in the college vacations, the professors were enabled to attend institute meetings, without interfering with their college work. We went out in January, 1885. We have done so every winter since, and the beneficial results have far exceeded our most sanguine expectations. The work began on a small scale, but the number of institutes has increased so rapidly that we have had to arrange for no less than 90 meetings in January, 1891. The professors have been benefited by listening to statements of experience made by practical farmers, and the farmers have been helped by the enunciation and discussion of the scientific principles which underlie the best farm practice. The college has been strengthened by the increased and ever increasing confidence of the farming community; and the country at large has been stirred up to a broader, deeper, and more intelligent interest in the great subject of agriculture. All this, as intimated above, is, I think, largely the result of arranging our college vacations in such a way that the professors are able to spend three weeks of the most suitable time each year at institute meetings throughout the Province.

Objection Urged.

From the first, we admitted that there was one objection to the present arrangement, viz., that the students are absent from the college in January two weeks longer than is desirable. January is a good month for study, and we would profer to have our boys return from their holidays two weeks sooner than at present. After all, this is only a slight objection, because it is always difficult for us to find suitable out-door employment for our students in winter; and for that reason two weeks in the month of June are of more advantage to a boy at an agricultural college than the same length of time in any of the winter months.

For the first four years after the change was made (the abolition of the Easter vacation and the addition of two weeks to the Christmas vacation, to enable professors to assist at farmers' institute meetings), no fault was found by any one. No objection was raised by students, by parents, nor by anyone else till about two years ago, when an agitation was begun, not by students nor by their parents, but by one or two others, to have our Christmas vacation made two weeks shorter and lectures end two weeks earlier in June—say on the 6th instead of on the 20th of that month.

To this agitation I have hitherto been opposed, because I have felt that its success would mean the severance of the connection which now exists between the College and the Farmers' Institutes.

Conclusion on This Question.

In conclusion, however, I wish to say that I have no personal interest to serve in this matter. Already I have had a great amount of labor in connection with the Institutes—voluntary labor for which I have received no remuneration; and I have no objection whatever to any change which will benefit both the college and the institutes, or strengthen either without injuring the other. So, if it is thought better for the College, the Institutes, and the Province at large, that our Christmas vacation should be made two weeks shorter and our professors should give up the institute work, with the exception of an occasional meeting—if, I say, this is thought better by those who are most interested, I shall offer no opposition to the proposed change.

WORK IN 1890.

The work in the different departments of the Institution has gone on smoothly and successfully during the past year. Nothing specially noteworthy has occurred; but good work has been done in all the departments.

The College.

There has been no change in our staff during the year. Full courses of lectures have been given in all the departments—

I. Agriculture, Live Stock, and Dairying;
II. Natural Science;
III. Veterinary Science:
IV. English Literature and Political Economy;
V. Mathmetics and Book-keeping.

As usual, we have laid special stress upon the three branches embraced in department No. 1. We have sought to keep prominently in view what we believe to be the first duty of an agricultural college, viz., to make its students good farmers—men well versed in the theory and practice of general agriculture, stock-breeding, stock-feeding, dairying, etc. At the same time, we have endeavored to do thorough and sufficiently comprehensive work in all the other departments. So far as we are aware, nothing has been neglected; and the students have done as hard and good work as those of any former period. We never had a more pleasant and successful year.

We have not had the pleasure of seeing any new buildings erected during the year; but we have done quite a little in the way of repairs and alterations—laying new hardwood instead of old pine floors in the College halls, painting and papering the President's office, putting in a new high pressure steam-boiler, fitting up a hospital in the College, and making the alterations necessary to get a new Y. M. C. A. hall.

For several years, the student's weekly prayer-meeting and our Sunday Bible-class were held in one of the College class-rooms, but always with more or less inconvenience or interruption. At length, in the fall of the year 1888, a branch of the Young Men's Christian Association was organized in the College. From that time the religious activity of the students gradually increased, and the necessity for a separate room for their meetings became more and more apparent. So in September last, by removing two or three partitions and by some expense in flooring, painting, papering, etc., we succeeded in making a very commodious, bright, and beautiful room, which shall henceforth be known as the Y. M. C. A. Hall. This hall is well lighted, is furnished with chairs for 100 students, and with a good organ for the musical part of their services. The organ, I may add, was purchased by the students themselves.

Smoking in the College.

In the changes which were necessary in order to make the Y. M. C. A. Hall, I had to abolish the old smoking-room. This I did without hesitation; but at the same time I set apart another room for the use of smokers, with the new regulation that it should be

open only three times a day, for three-quarters of an hour immediately after breakfast, after dinner, and after tea; and that at those times it should be under the direct control and supervision of one of the College officers. None but smokers are admitted to this room: and since the change, I am pleased to say, there have been only three smokers in the College.

College Hospital.

Owing to the very healthful situation of the College, and the mercies of a kind Providence, we have hitherto been almost entirely free from all the most serious forms of disease. During the eleven and a half years of my connection with the Institution, we have not had a single case of typhoid fever, and it is doubtful whether we have had a case of real diphtheria. During the same period we have had only one death, and that was caused by hemorrhage of the lungs in the case of a young Englishman who came to this country in a very delicate state of health. So, all considered, I think I may say that we have been singularly fortunate in our exemption from sickness. At the same time we must admit that we have not been entirely free, We have had attacks of measles two or three times; and in the fall of the year, our students are frequently troubled with colds, sore throats, and various ailments which arise from exposure, sudden changes of temperature, and other well-known causes. In all such cases, prompt attention is required; and, in some instances, suitable means of isolation from the rest of the students are almost a necessity.

Hitherto, however, we have not had any room or rooms properly heated, furnished, and insolated for the use of sick students. Our faithful physician, Dr. E. W. McGuire, has often and persistently urged the need of a hospital of some kind in the College; but various difficulties stood in the way till a few weeks ago, when the Minister of Agriculture gave his consent to the alterations and expenditure necessary to fit up, heat, and furnish a section in the upper story of one of our dormitory buildings for hospital purposes. The work was at once undertaken; and already we have a first-class hospital on a small scale—a medium-sized room for one bed, a larger room for two beds, and a bath-room, with hot and cold water, bath-tub, wash-basin, and water-closet, all well heated, well lighted, well ventilated, nicely painted, suitably furnished, and properly isolated from the rest of the building.

Department of Chemistry.

The chief items of general interest in this department are the analysis of sugar-beets and a change in our method of teaching elementary chemistry. During the autumn months, a good deal of time was spent in analysing samples of sugar-beets which were sent here from various parts of the Province. One hundred and seventeen samples were analysed, and the results were published in a bulletin issued by the Department of Agriculture about the middle of December. A fuller statement of facts and conclusions will be found in Professor James's report in Part III. of this Volume.

Until 1890, we followed the usual method of teaching the first principles of chemistry to our students, that was, by a systematic course of lectures and experiments in the class-room This method was fairly successful; but, about six months ago, Professor James decided to introduce the method of putting every student to work in the laboratory from the very beginning. Our chemical lecture-room and the student's portion of the laboratory are close together. Hence it takes only a moment to pass from the one to the other. At the beginning of the term, every student has a place allotted to him in the laboratory and the necessary outfit of chemicals and apparatus placed at his disposal; and the work is carried on daily by the Professor illustrating and stating a few facts or principles in the lecture-room, after which the students proceed at once to repeat the experiments in the laboratory, each working by himself and all under the supervision and direction of the Professor. By this method the students do not advance so quickly, but they take greater interest in their work and understand it much better.

Department of Natural History.

For a full account of the work done in this department, I would refer the reader to Professor Panton's report in Part II. of this Volume. There will be found many items of interest relating to the department proper, and the annual statement of facts and figures regarding our reading-room, library, and museum. Professor Panton has given much time to the practical study of botany during the last two or three years, and has devoted special attention to the noxious weeds of this Province. Early last year, at Professor Panton's request, and with a view to assist him in his work, we constructed a large case with a glass front, 54 feet long, against one wall of the museum; and, for the information of students and visitors, Professor Panton is placing in this case a large number of samples of weeds collected from different parts of the Province and arranged so as to exhibit, as far as possible, the root, stem, leaves, and flower of each sample.

Dairy Department.

In the Department of Dairying, we have been without a Professor during the past year; but the work has not been neglected. The usual course of lectures in that department was given in the spring by our old Professor of Dairying, J. W. Robertson, who is now employed as Dairy Commissioner for the Dominion; and the work in connection with the Creamery and Experimental Dairy has been successfully managed throughout the year by George Harcourt, B.S.A., who has been acting as assistant in the Dairy Department.

Mr. Harcourt, having rendered faithful and efficient service in the Dairy Department, has lately been appointed to the position of assistant chemist, with an increase of $200 a year in his salary; and H. H. Dean, B.S.A., also one of our own graduates, has been chosen for the professorship of dairying, to enter upon his duties on the first January, 1891. Mr. Dean took Professor Robertson's full course of lectures on dairying, stood high in his final university examination on that subject, spent the past summer at practical work in the creameries and cheese factories of Ontario, and has, for the last few months, been employed as dairyman of the New York Experiment Station, at Geneva, N. Y. Mr. Dean has been brought up on a Canadian farm. He is a good scholar, a fluent speaker, and a hard worker. Hence we entertain hopes that he will be successful in the important position which he has been called upon to fill.

Experiments.

Our experimental work has been rapidly extending within the last year or two. Since C. A. Zavitz, B. S. A., was appointed assistant director in that department and allowed to devote his whole time and thought to it, much valuable work has been done. Fifty acres, divided into plots varying from one acre to 1-20th of an acre, are now devoted to experiments; and during the past year, (under the supervision of Professor Shaw), Mr. Zavitz, with such help as he needed, and with the special assistance of Mr. Alexander Cuppage in feeding and looking after cattle and pigs, has made a large number of more or less important experiments—has tested 270 varieties of grain (wheat, oats, peas, and barley), thirty varieties of potatoes, and ninty varieties of turnips, beets, and mangels, and has also tried different methods of cultivation, several kinds of fertilizers, different dates of seeding, etc. With cattle and pigs also, a number of experiments are being conducted, in order to determine, as far as possible, the respective merits of different breeds and the comparative values of various kinds of food and methods of feeding. For full information on these points, see Professor Shaw's and Mr. Zavitz's report in Part VII. of this volume.

Farm Proper.

On the farm proper, Professor Shaw, with the help of Mr. J. E. Story, our very faithful and efficient farm foreman, has continued his special efforts for the destruction of noxious weeds, a few varieties of which, especially Canadian thistles, are still more numerous than they should be on a model farm. He has also spent much time, a good deal of hard work, and a considerable sum of money in grading our farm lane, and in grading and gravelling some of the public roads adjoining the farm. When this work is finished, it will add very much to the beauty of the farm and its surroundings.

Garden, Lawn, Etc.

The work on our large lawn and in the vegetable garden has gone on as usual during the year. Nothing specially noteworthy has occurred; and all I need do, is to emphasise and re-emphasise our great need of new Green and Propogating Houses, in order to make the Horticultural Department of real service to the College and the country.

Last spring, our gardener, Mr. James Forsyth, made a considerable addition to our fruit garden, by setting out in the field adjoining his own residence a considerable selection of trees and plants, such as he thought necessary to make our fruit supply all that is required. This addition consists of 217 apple trees, 20 pear trees, 137 grape vines 245 gooseberry bushes, 271 currant bushes, 815 raspberry plants, and 1,830 strawberry plants.

Clumps of Forest Trees.

It may not be amiss, at this stage in our history, to submit a few notes on the results of our experience in the planting and growing of forest trees. Much might be said on this subject; but we shall state only a few facts as follows:—

Black walnut.—In 1881 we planted with black walnuts, from twelve to fifteen inches high, a piece of clay loam, a little less than half an acre, on the side of a slope exposed to the west and north-west winds. The plants were obtained from seed which we had sown two years before, and were set out with a view to form a clump of valuable shade trees. They were set in rows six feet apart and the same distance from one another in the rows. The soil between the rows has been ploughed lightly once a year and cultivated twice, with a little hoeing, to kill weeds and keep the ground open.

Regarding this plantation we beg now to report that the trees have all grown well, without damage from frost or any other cause. During last summer they looked quite healthy and seemed likely to do well in future, notwithstanding the severity of our Guelph climate. In the month of August we measured a number of them and found that in nine years they had attained a growth of from twelve to twenty feet high, being $3\frac{1}{2}$ to 5 inches in diameter near the root, and $2\frac{1}{2}$ to $3\frac{3}{4}$ inches in diameter four feet above the ground. About half of them are of the larger size.

We may add that in the cultivation of these walnuts and other trees we have proved beyond doubt that, when the soil around trees is kept clean and loose by stirring occasionally in dry weather, the trees grow much more rapidly than when the ground around them becomes hard or grass is allowed to grow about them.

European larch.—In the same year, 1881, we planted also another plot of ground, about a quarter of an acre, with European Larch, of the same size as the walnuts, namely twelve to fifteen inches high. We raised the plants from seed and set them in rows five feet apart and the same distance from one another in the rows. Our object was twofold: (1) to conceal a gravel pit from view, and (2) to test the European Larch in this locality and climate.

For the first five years after planting, the ground was cultivated more or less with the plough, scuffler, and hoe. Since that time the space has been completely occupied, so that we have not had room for either ploughing or hoeing among the trees.

During last summer this plantation presented a beautiful appearance, not only concealing the unsightly gravel pit as we desired, but adding an element of beauty and interest to the landscape. The trees were found to be from twelve to twenty-four feet high, growing nicely and looking very thrifty. They vary in diameter from 3 to 5½ inches near the root, and from 2½ to 4½ inches five feet above the ground.

For the informatian of those who are not familiar with the European Larch, we may say that it is of the same genus as the Canadian Tamarack, which is known as the American Larch (*Larix Americana*). The European Larch resembles the Tamarack, but is a different species and is much more valuable. The timber of the European Larch is difficult to split, is very durable, and in value is equal to Douglas Pine.

I may add that one of the best trees in this plantation is growing on the edge of the gravel ridge in almost pure gravel.

Ash-leafed maple (*Negundo Aceroides*).—We have a third clump consisting of a variety of trees planted in 1882. It would, perhaps, be interesting to compare these trees as to height, thickness, &c., but at present we shall speak of only one species, viz., the ash-leafed maple of Manitoba and the North-west. Among the other trees of this clump several of this so-called maple were planted eight years ago; and at the present time they are very much larger than any other kind of tree in the plantation, being from twenty-two to twenty-five feet high, averaging eight inches in diameter near the root, and six inches in diameter five feet above the ground. The tree is not so handsome as our common hard or soft maple, but it makes a nice shade tree and grows much faster than any other tree on this farm.

Forest tree plantation.—Our gardener, Mr. James Forsyth, who planted and has taken care of the clumps mentioned above, also lately (last spring) replanted a four-acre field with a variety of forest trees—white oak, white ash, black walnut, hickory, maple, catalpa, pine &c. This field was gradually cleared to furnish firewood; and when the stumps had pretty well rotted, we ploughed it up and took two crops off it (potatoes and peas), after which we ploughed, harrowed, and re-planted it with trees in rows eight feet apart, and in such a way that it can be cultivated in three directions with the plough and scuffler.

We have found that where horse cultivation is to be used, trees in clumps or plantations should not be planted nearer than eight feet, even when it is intended to remove some of them after a few years growth.

Importance of replanting.—There are many barren knolls and stony or gravelly fields throughout the Province that would be greatly improved by replanting. They are now only so many eye-sores in the landscape, little or no use to the owners; and in most cases they detract from the value of good land in the immediate neighborhood. If replanted, protected, and looked after for a few years, these same pieces of land would soon become the most beautiful spots in the country; and before long the trees grown on them would be a source of profit to the growers.

Students in Attendance.

The attendance during the past year has been quite satisfactory—twelve more than the year before. The total number on the roll is 146, seventy-five per cent. of whom are from the Province of Ontario. Thirty-three counties of Ontario are represented, and the largest representation is from the counties of Grey, Middlesex, York, Prince Edward, Huron, and Waterloo. Of the forty-nine who entered in October last, seventy-seven per cent. are farmers' sons; and I have no hesitation in saying that never before in the history of the College were our students so quiet, industrious, and well-behaved as they have been during the term which ended on the 22nd of December last.

Analysis of Roll.

Counties, Etc.	No. of Students.	Counties, Etc.	No. of Students.
Brant	4	Norfolk	2
British Columbia	4	Northumberland	2
Bruce	2	Northwest Territories	2
Carleton	3	Nova Scotia	4
Cape Breton	1	Ontario (County)	2
Dufferin	2	Oxford	4
Dundas	1	Peel	2
England	16	Perth	2
France	2	Prince Edward County	6
Frontenac	1	Prince Edward Island	1
Grey	8	Quebec	3
Haldimand	1	Rainy River District	1
Hamilton	1	Scotland	1
Hastings	2	Simcoe	3
Huron	5	Stormont	2
India	2	Switzerland	1
Kent	4	Toronto	6
Lanark	2	Victoria	1
Lincoln	4	Waterloo	5
Leeds	4	Welland	3
Lennox	2	Wellington	4
Middlesex	6	Wentworth	3
Muskoka	2	York	6
New Brunswick	1		
New York, U. S. A	1	Total	146

Religious Denominations.

Methodists	44	Evangelical Association	1
Episcopalians	39	Mennonites	1
Presbyterians	39	Plymouth Brethren	1
Baptists	6	Disciples	1
Congregationalists	6		
Roman Catholics	5	Total	146
Friends	3		

Age of Students.

11	16 years	4	23 years
20	17 "	6	24 "
24	18 "	6	25 "
24	19 "	4	26 "
20	20 "	2	27 "
11	21 "	2	28 "
12	22 "	1	29 "

Average age, 20 years.

COUNTY STUDENTS.

Of those in attendance during the year, forty-five were nominated by county councils, and as a consequence were exempted from the payment of tuition fees. The counties represented were the following:—

Brant, Bruce, Carleton, Dufferin, Dundas, Frontenac, Grey, Hastings, Haldimand, Huron, Kent, Lanark, Leeds, Lennox, Lincoln, Middlesex, Muskoka, Norfolk, Northumberland, Ontario, Peel, Prince Edward, Rainy River District, Simcoe, Stormont, Victoria, Waterloo, Welland, Wellington, York.

CLASS-ROOM WORK.

Our class-room work has gone on as usual during the past year. The candidates for degrees were all successful in passing their examinations, and a fair proportion of first and second year students gained a respectable standing; but the number of failures is still much larger than it should be.

Examiners.

The third year examinations were conducted by the University of Toronto, and those of the first and second years by the professors of the College and four other gentlemen to whom we are much indebted.—

E. C. Jeffrey, B.A	English Literature.
W. A. Douglas, B.A	Political Economy.
E. L. Hill, B.A	Botany.
J. A. Craig, B.S.A	Entomology.

Bachelors of the Science of Agriculture.

Five candidates for the degree of B.S.A. were examined in the month of May. These candidates were all successful, and received their degrees at the regular convocation of the University of Toronto, on the 10th of June. The list is as follows:—

Brodie, G. A	County of	York, Ont.
Dean, H. H	"	Brant, Ont.
McCallum, W	"	Middlesex, Ont.
Monteith, S. N	"	Perth, Ont.
Shantz, A	"	Waterloo, Ont.

Recipients of Associate Diplomas.

Twenty-three young men, having completed the course of two years, received diplomas admitting them to the status of Associates of the College. The diplomas were presented by the Hon. Charles Drury, Minister of Agriculture, at our closing exercises on the 30th of June, and the names of the recipients are as follows:—

Brown, H H	Chatham, Kent, Ont.
Buchanan, D	Hensall, Huron, Ont.
Campbell, C. S	Brantford, Brant, Ont.
Cowan, J. H	Galt, Waterloo, Ont.
Cowan, R. E	Galt, Waterloo, Ont.
Dolsen, W. J	Chatham, Kent, Ont.
Elliott, R	Seaforth, Huron, Ont.
Field, H	Cobourg, Northumberland, Ont.
Hadwen, G. H	Mons en Bareul, France.

RECIPIENTS OF ASSOCIATE DIPLOMAS—*Continued.*

Harcourt, J.	St. Anns, Lincoln, Ont.
Hewgill, E. A.	Heathcote, Grey, Ont.
Holliday, W. B.	North Shields, England.
Hutt, H. L.	South End, Welland, Ont.
Macfarlane, T. W. R.	Ottawa, Ont.
McKergow, J. G.	Montreal, Quebec.
Monk, W. D.	South March, Carleton, Ont.
Mulholland, F.	North Toronto, York, Ont.
Sleightholm, J. A. B.	Humber, Peel, Ont.
*Webster, F. E.	Creemore, Simcoe, Ont.
*Wells, E.	Chilliwhack, B. C.
*Wilson, F. G.	Green River, Ontario Co., Ont.
*†Wood, W. D.	Cornwall, Stormont, Ont.
Whitley, C. F.	Enfield, Middlesex, England.

FIRST-CLASS MEN.

The work in the College is divided into five departments and all candidates who get an aggregate of 75 per cent. of the marks allotted to the subjects in any department, are ranked as first-class men in that department. We would like to have a larger number of such men; but we are determined that none shall be so ranked unless they really deserve it. The following list contains the names of those who gained a first-class rank in the different departments at the examinations in 1890:—

FIRST YEAR.

1. *Burns, J. A. S.*, Halifax, N. S.—In two departments; Agriculture and Natural Science.
2. *Carlyle, W. L.*, Chesterville, Dundas, Ont.—In two departments; Agriculture and Veterinary Science.
3. *Gibson, D. Z.*, Willow Grove, Haldimand, Ont.—In four departments; Agriculture, Natural Science, Veterinary Science, and English Literature.
4. *Harris, J. E.*, Calne, Wilts, England.—In one department; Agriculture.
5. *Morgan, R. N.*, Kerwood, Middlesex, Ont.—In four departments; Agriculture, Natural Science, English Literature, and Mathematics.
6. *Wilkin, F. A.*, Calgary, North-West Territory.—In three departments; Agriculture, Veterinary Science and Mathematics.
7. *Wills, H. G.*, Toronto, Ont.—In one department; Mathematics.

SECOND YEAR.

1. *Buchanan, D.*, Hensall, Huron, Ont.—In two departments; Agriculture and Veterinary Science.
2. *Cowan, R. E.*, Galt, Waterloo, Ont.—In two departments; Agriculture and Veterinary Science.
3. *Hadwen, G. H.*, Mons en Bareul, France.—In two departments; English Literature and Mathematics.
4. *Harcourt, J.*, St. Anns, Lincoln, Ont.—In three departments; Agriculture, Natural Science, and Veterinary Science.
5. *Hutt, H. L.*, South End, Welland, Ont.—In three departments; Agriculture, Natural Science, and Veterinary Science.

* Required to take Milton's "L'Allegro and "Il' Pensoroso" again.
† Has to pass another examination in Veterinary Anatomy.

6. *Sleightholm, J. A. B.*, Humber, Peel, Ont.—In one department; Agriculture.
7. *Whitley, C. F.*, Enfield, Middlesex, England.—In two departments; Agriculture and English Literature.

Medallists.

Medals were given to the three students who ranked highest in general proficiency in the theory and practice of the second year. The competition was keen, as usual, with the following results:—

Gold Medalist.—H. L. Hutt, South End, Welland, Ont.
First Silver Medalist.—J. Harcourt, St. Anns, Lincoln, Ont.
Second Silver Medalist.—R. E. Cowan, Galt, Waterloo, Ont.

First Year Prizemen.

Agriculture and Dairying.—1st, D. Z. Gibson, Willow Grove, Haldimand, Ontario; 2nd, W. L. Carlyle, Chesterville, Dundas, Ont.

Natural Science.—1st, J. A. S. Burns, Halifax, N. S; 2nd, D. Z. Gibson.

Veterinary Science.—1st, D. Z. Gibson; 2nd, F. A. Wilkin, Calgary, N. W. T.

English Literature and Composition.—1st, D. Z. Gibson; 2nd, W. F. Newcomen, Epping, Essex, England.

Mathematics and Book-keeping.—1st, F. A. Wilkin; 2nd, H. G. Wills, Toronto.

General Proficiency.—1st, D. Z. Gibson; 2nd, J. A. S. Burns; 3rd, F. A. Wilkin.

Second Year Prizemen.

Agriculture, Live Stock, Dairying,—1st, H. L. Hutt; 2nd, J. Harcourt.

Natural Science.—1st, H. L. Hutt; 2nd, J. Harcourt.

Veterinary Science.—1st, R. E. Cowan; 2nd, H. L. Hutt.

English Literature.—1st, C. F. Whitley; 2nd, G. H. Hadwen.

Mathematics.—1st, G. H. Hadwen; 2nd, H. L. Hutt.

General Proficiency.—1st, H. L. Hutt; 2nd, J. Harcourt; 3rd, R. E. Cowan; 4th, C. F. Whitley.

Closing Exercises.

Our closing exercises took place on the 30th June. The weather was fine and the attendance large. There were between 400 and 500 people present from Guelph and the surrounding district, many having driven from fifteen to twenty miles to spend a few hours with us. We were favored especially with the presence of the Hon. Charles Drury, Minister of Agriculture, and Sir Daniel Wilson, president of the University of Toronto. Both these gentlemen took part in the formal exercises and delivered addresses, which were very much enjoyed by those who had the pleasure of hearing them. James Innes, M.P., D. Guthrie, M.P.P., and several other leading men from Guelph were also present and assisted in the presentation of medals and prizes.

Valedictory Addresses.

The second year men chosen by their fellow students to deliver the Valedictory Addresses at the closing exercises were F. C. Whitley and H. L. Hutt.

FARMERS' INSTITUTES.

The work of the Farmers' Institutes is still increasing in magnitude and importance. We gave assistance at 75 meetings in January, 1890, and have arranged to attend 95 meetings in January and 4 in February, 1891.

The following is the list of Institute meetings to be held in January, 1891, as arranged by myself, under instructions from the Minister of Agriculture, and in consultation with Nicholas Awrey, M.P.P., president of the Central Farmers' Institute:—

Division No. 1.

Prof. Grenside; T. Raynor, B.S.A.; T. H. Race, Esq.—Tara, 2nd January; Port Elgin, 3rd January; Paisley, 6th January; Walkerton, 7th and 8th January; Listowel, 9th January; Milverton, 10th January; Brussels, 12th and 13th January; Smith's Hill, 13th and 14th January; Exeter, 16th and 17th January; Lucan, 19th January; Park Hill, 20th January; Thorndale, 21st and 22nd January.

Division No. 2.

John I. Hobson, Esq.; C. A. Zavitz, B.S.A.; D. W. Beadle, Esq.—New Hamburg, 2nd and 3rd January; St. Mary's, 6th January; Wyoming, 7th and 8th January; Appin, 9th and 10th January; Chatham, 12th January; Wallaceburg, 13th January; Dawn Mills, 14th January; Belle River and Woodslee, 16th and 17th January; Kingsville, 19th and 20th January; Highgate, 21st January; West Lorne, 22nd January; Shedden, 23rd January.

Division No. 3.

President Mills; W. H. McNish, Esq.; L. Woolverton, M.A.—Freelton, 2nd and 3rd January; Embro, 6th January; Norwich, 7th and 8th January; Aylmer, 9th and 10th January; Delhi, 12th January; Port Rowan, 13th January; Vittoria, 14th January; Caledonia, 15th and 16th January; Waterford, 17th January; Welland, 19th January; Port Colborne, 20th January; Pelham, 21st and 22nd January.

Division No. 4.

John McMillan, M.P.: F. J. Sleightholm, Esq.; E. D. Smith, Esq.—Weston, 2nd and 3rd January; Brampton, 6th January; Milton, 7th January; Burlington, 8th January; Hamilton, 9th and 10th January; Jordan, 12th and 13th January; St. George, 14th and 15th January; Burford, 16th and 17th January; Berlin, 19th and 20th January; Guelph, 21st and 22nd January.

Division No. 5.

Professor J. H. Panton; D. E. Smith, Esq, B.A; and A. H. Pettit, Esq.—Newmarket, 2nd and 3rd January; Bondhead, 6th January; New Lowell, 7th and 8th January; Thornbury, 9th January; Owen Sound, 12th January; Markdale, 13th January: Shelburne, 14th and 15th January; Erin, 16th January; Glenallan, 19th January; Drayton, 20th January; Durham, 22nd January.

Division No. 6.

*Professor H. H. Dean; N. F. Fraser, Esq.; *W. Cowan, V.S.; and P. C. Dempsey, Esq.*—Markham, 2nd January; Uxbridge, 3rd January; Cannington, 6th January; Little Britain, 7th and 8th January; Bobcaygeon, 9th January; Fenelon Falls, 10th

January; * Peterboro', 12th and 13th January; * Harwood, 14th January; * Keene, 15th January; Warkworth, 16th and 17th January; * Brechin, 19th January; * Orillia, 20th and 21st January; *Alliston, 22nd and 23rd January.

Division No. 7.

Professor C. C. James; Edward Jeffs, Esq; and G. C. Caston, Esq.—Oshawa, 2nd and 3rd January; Bowmanville, 6th January; Orono, 7th January; Baltimore, 8th January; Cold Springs, 9th January; Picton, 10th January; Napanee, 12th and 13th January; Centreville, 14th and 15th January; Sunbury 16th and 17th January; Delta, 19th January; Lansdowne, 20th January; Lyn, 21st January.

Division No. 8.

Professor Thomas Shaw; George Harcourt, B.S.A.; and E. Morden, Esq.—Perth, 2nd and 3rd January; Lanark, 6th January; Carp, 7th and 8th January; Renfrew, 9th January; Rockland, 12th and 13th January; Vankleek Hill, 14th and 15th January, Alexandria, 16th and 17th January; Cornwall, 19th and 20th January; Morrisburg, 21st and 22nd January.

Supplementary List.

Hon. Charles Drury and Prof. H. H. Dean.—Kenilworth, 3rd February; Bracebridge, 5th February; Utterson, 6th February; Thessalon, 9th and 10th February; Sault Ste. Marie, 11th and 12th February.

In this list the speakers were so arranged that each deputation consisted of a Professor, a practical farmer, and a representative of the Fruit Growers of Ontario. The only exceptions were in the case of Mr. Hobson, Mr. McMillan, and Hon. Charles Drury, who took the place of professors at the meetings for which they were announced. By this arrangement it was thought that the meetings might be made were interesting and profitable to all classes and sections of the farming community.

FINANCIAL STATEMENT.

I.—College Expenditure.

(a) Maintenance.

1.	Salaries and wages	$12,962 58
2.	Food—	
	Meat, fish, and fowl	2,771 78
	Bread and biscuits	559 42
	Groceries, butter, and fruit	3,412 33
3.	Household expenses—	
	Laundry, soap, and cleaning	134 15
	Women servants' wages—cooks, housemaids, etc	1,607 60
4.	Business Department—	
	Advertising, printing, postage, and stationery	1,212 09
5.	Miscellaneous—	
	Laboratory—chemicals, apparatus, etc	402 51
	Library—books, papers, and periodicals	372 13
	Medals	71 32
	Unenumerated	926 68
		$24,432 59

(*b*) *Maintenance and Repairs of Government Buildings.*

Furniture and furnishings	$ 697 00	
Repairs and alterations	1,134 92	
Fuel	2,275 73	
Light	862 60	
Water	650 00	
Sewage disposal	159 91	
		$5,780 16
		$30,212 75

College Revenue.

1. Tuition fees	$1,655 37	
2. Laboratory fees for gas and chemicals used by third year students	212 00	
3. Balances paid for board, after deducting allowances for work on farm, etc	3,842 66	
4. Fines, breakages, etc	89 33	
5. Charges for supplemental examinations	36 75	
6. Sales of bones	3 61	
7. Sale of old iron	2 00	
		$5,841 72
Net cash expenditure of College		$24,371 03

The net sum voted by the Legislature for the maintenance of the College (see estimates for 1890, pp. 35 and 40) was $26,585. Hence, the unexpended balance for the year is $2,213.97

II.—Farm.

(*a*) *Farm Proper.*

1. Permanent Improvements—fencing, road-making, moving sheep barn, etc	$ 873 87	
2. Farm maintenance—		
Salaries and wages	3,159 52	
Live stock	4,105 43	
Maintenance of stock	1,291 14	
Seeds	227 66	
Binding twine	39 10	
Repairs—lumber, blacksmithing, etc	450 00	
Furniture and furnishings—pails, tools, etc	463 78	
Implements	293 44	
Advertising, printing, postage, and stationery	598 15	
Fuel and light	23 28	
Contingencies	233 72	
		$10,885 22
		11,759 09
Less farm revenue		7,004 49
Net expenditure of Farm Proper		$4,754 60

(*b*) *Experiments.*

Salaries and wages—		
Assistant Superintendent	$800 02	
Instructor (part wages)	93 74	
Labor	880 26	
		$1,774 02
Seeds		138 23
Fertilizers		40 33
Manures		196 98
Live stock for experimental feeding		10 00
Furniture, furnishings, repairs, etc		365 93
Printing, postage, and stationery,		36 11
Implements		329 93
Feed and fodder—oil cake, etc		99 93
Exhibitions		265 74
Contingencies		8 00
		$3,265 20

III.—Experimental Dairy.

Salaries and wages—		
Salary of Assistant	$600 00	
Labor	600 80	
		$1,200 80
Live stock—pigs		80 15
Feed and fodder		505 82
Furniture, furnishings, repairs, etc		121 04
Laboratory expenses—gas, chemicals, etc		31 93
Printing, postage, and stationery		22 63
Contingencies		7 62
		$1,969 99
Less revenue—		
Cows sold (capital)	$ 123 15	
Sales of pigs, butter, milk, etc	1,243 71	
		1,369 86
Net expenditure of Experimental Dairy		$600 13

IV.—Garden, Lawn, Etc.

Salaries and wages—		
Foreman (part salary)	$ 499 00	
Assistant	440 00	
Second Assistant	216 90	
Teamster	305 25	
Laborers	1,183 34	
		2,644 49
Manure		104 25
Seeds, bulbs, plants, trees, etc		171 23
Furniture, furnishings, repairs, etc		144 09
Fuel and light		26 06
Contingencies		6 05
		3,096 17
Less cash revenue (vegetables and colt sold)		146 30
Net expenditure of Horticultural Department		$2,949 87

V —Instruction.

Salaries and wages—		
Farm foreman (part salary)	$400 00	
Gardener (part salary)	201 00	
Carpenter (part salary)	400 00	
Instructor (part wages)	125 00	
Cattleman (part wages)	99 99	
		1,225 99
Lumber, nails, oil, paint, etc., for practice		
Furniture, furnishings, tools, etc., for practice		42 25
Fuel		18 87
		$1,287 11

Total net expenditure for Maintenance in all Departments in 1890.

College	$24,371 03
Farm Proper	4,754 60
Experimental Plots and Feeding	3,265 20
Experimental Dairy	600 13
Garden, lawn, etc	2,949 87
Instruction	1,287 11
	$37,227 94

A comparison of these figures with the estimates for 1890, will show that there is an over expenditure as follows: Farm proper, $1,519.60; Experimental Plots and Feeding, $285.20; and Garden, Lawn, etc., $1.87 —making a total over-expenditure of $1,806.67; but, against this, there are unexpended balances—College, $2,213.97; Experimental Dairy, $1,079.87; and Instruction, $112.89. Hence, when all is added together, the total maintenance expenditure for the year is $1,600.06 less than the sum voted by the Legislature for that purpose.

VI.—College in Account with Farm and Garden.

(*a*) *With Farm.*

To 567 bushels of potatoes, at 40c	$226 80
" 4,248 gallons milk, at 12c	509 76
" cartage for College	30 00
" feed for College horse (without attendance)	75 00
" feed for Bursar's horse (without attendance)	75 00
" carpenter work by students, etc	15 00
	$931 56

(*b*) *With Garden.*

To fruit and vegetables (for items and prices, see Mr. Forsyth's Report, Part V.)	591 91
Total	$1,523 47

By amount paid by College for student labor on Farm and Garden (mostly on farm)	$3,027 34	
" half of farm superintendent's salary	1,000 00	
		4,027 34
" balance to credit of College		$2,503 87.

Buildings Needed.

In conclusion, I may say that we still require four or five additional bulldings to put us in a position to do satisfactorily and efficiently the work which we have undertaken. Those which are most urgently needed are :—

(1) A building to be used as a Convocation Hall and Gymnasium.

(2) New green and propagating houses.

(3) A house for the Professor of Chemistry.

(4) A house for the Professor of Natural History.

Hoping that you may find it possible to erect some of these buildings before the close of the year 1891,

I have the honor to be, sir,

Your obedient servant,

JAMES MILLS,
President.

PART II.

REPORT OF THE

PROFESSOR OF NATURAL HISTORY AND GEOLOGY.

Ontario Agricultural College.
Guelph, December 31st, 1890.

To the President of the Ontario Agricultural College:

Sir,—In submitting to you a report of the department of Natural History, it will be convenient to consider it under the following topics:—

1. Museum.
2. Library.
3. Reading-room.
4. Practical work.

1. College Museum.

During this year some improvements have been effected in our museum.

A collection of weeds has been made, which forms an attractive centre to many visitors. It contains sixty-five full sized specimens, representing twenty-three orders, fifty-seven genera and sixty-five species.

These typical plants are not pressed, but put in the case and allowed to dry. Root, stem, leaf, flower and seed are secured as far as possible so that the collection may be interesting, attractive and instructive. Each plant is labelled with the common and scientific name by which it is known. A large card in each division bears the name of the family or order. Many of the plants retain their form well and present characters by which they may be readily known.

In connection with this we are endeavoring to secure a collection of weed seeds. These will be placed along with the plants, so that the thoughtful student will be enabled to identify the seeds of injurious plants as well as the plants that bear them. The following is the results of our work this season:—

ORDER I.

Ranunculaceæ (Crowfoot Family).

Ranunculus Sceleratus ..... Cursed Crowfoot.
Aconitum Napellus ..... Monkshood.

ORDER II.

Cruciferæ (Mustard F).

Lepidium Virginicum	Pepperwort.
Sinapis arvensis	Common Mustard.
Capsella Bursa-pastoris	Shepherd's Purse.
Thlaspi arvense	Penny Cress.
Camelina sativa	False Flax.

ORDER III.

Caryophyllaceæ (Pink F).

Lychnis vespertina	White Cockle.
Silene inflata	Bladder Campion.
Lychnis Githago	Cockle.
Stellaria media	Chickweed.

ORDER IV.

Portulacaceæ (Purslane F).

Portulaca oleracea	Purslane.

ORDER V.

Malvaceæ (Mallow F).

Malva rotundifolia	Mallow.
Malva moschata	Musk Mallow.

ORDER VI.

Leguminosæ (Pulse F).

Vicia cracca	Wild Tare.
Melilotus officinalis	Yellow Melilot.
" alba	White "

ORDER VII.

Onagraceæ (Evening Primrose F).

Oenothera biennis	Evening Primrose
Epilobium angustifolium	Willow-herb.

ORDER VIII.

Anacardiaceæ (Cashew F).

Rhus venenata	Poison Sumach.

ORDER IX.

Dipsaceæ (Teasel F).

Dipsacus sylvestris	Wild Teasel.

ORDER X.

Compositæ (Composite F).

Senecio vulgaris	Groundsel.
Ambrosia artemisiæfolia	Ragweed.
Maruta Cotula	May-weed.
Sonchus oleraceus	Sow-thistle.
Erechthites hieracifolia	Fire-weed.
Arctium Lappa	Burdock.
Cichorium Intybus	Chicory.
Rudbeckia hirta	Cone-flower.
Leucanthemum vulgare	Ox-eye Daisy.
Taraxacum officinale	Dandelion.
Achillæa Millefolium	Yarrow.
Tanacetum vulgare	Tansy.
Solidago Canadensis	Goldenrod.
Erigeron Philadelphicum	Fleabane.
Cnicus arvensis	Common Thistle.
Cnicus lanceolatus	Bull Thistle.

ORDER XI.

Plantaginaceæ (Plantain F).

Plantago major	Common Plantain.
P. lanceolata	Ribgrass.

ORDER XII.

Scrophulariaceæ (Figwort F).

Verbascum Thapsus	Mullein.
Veronica peregrina	Neckweed.
Linaria vulgaris	Toadflax.

ORDER XIII.

Verbenaceæ (Vervian F).

Verbena hastata	Vervian.

ORDER XIV.

Labiatæ (Mint F.)

Nepeta Cataria	Catnip.
Leonurus Cardiaca	Motherwort.

ORDER XV.

Borraginaceæ (Borage F).

Cynoglossum officinale	Hounds-tongue.
Echium vulgare	Blue-weed.
Echinospermum Lappula	Stickseed.
Lithospermum arvense	Pigeon-weed.

ORDER XVI.

Convolvulaceæ (Convolvulus F).

Convolvulus arvensis	Bind-weed

ORDER XVII.

Solanaceæ (Nightshade F).

Datura Stramonium	Thorn Apple.

ORDER XVIII.

Asclepiadaceæ (Milkweed F).

Asclepias cornuti	Milkweed.

ORDER XIX.

Euphorbiaceæ (Spurge F).

Euphorbia Cyparissias	Yellow Spurge.

ORDER XX.

Chenopodiaceæ (Goosefoot F).

Chenopodium album	Lamb's-quarters.
C. capitatum	Strawberry Blite.

ORDER XXI.

Polygonaceæ (Buckwheat F).

Rumex crispus	Dock.
Polygonum aviculare	Doorweed.
Rumex acetosella	Field Sorrel.

ORDER XXII.

Amarantaceæ (Amaranth F).

Amarantus retroflexus	Pigweed.

ORDER XXIII.

Gramineæ (Grass F).

Avena fatua	Wild Oat.
Bromus secalinus	Chess.
Setaria glauca	Foxtail.
Agropyrum repens	Couch-grass.
Panicum crus-galli	Barnyard-grass.
P. capillare	Old-Witch Grass.

We have also added to our collection of insectivorous birds, and hope by the end of another year to have a complete list that will represent birds which are beneficial to the farmer and the fruit-grower.

During 1890 we have received a few donations to the museum, for which we express thanks to the donors, and hope that they and others will remember we are always ready to receive any specimens that will aid us in teaching.

The following is a list of the contributors:—Miss Vail, Guelph, peculiar growths upon stems; Nelson Monteith, B.S.A., crow's nest; Wm. Shaw, Agrl. College, nest and eggs of the cedar bird; Mrs. Barnett, Niagara Falls south, a Bolivian dress; J. B. Bealey, student, wasp's nest; Jacob Stroh, Waterloo, marl from banks of Grand River; J. Hoyes Panton, Agrl. College, eggs of salmon and white fish, specimens of newly hatched fish; specimens from Mammoth Cave, Ky., Wyandot Cave, Ind., and Yellowstone Park illustrating facts in geology.

Library.

Several useful books have been added this year and our list is gradually embracing a most valuable collection of books for students reading along the lines of agricultural science. A special catalogue has been prepared for the use of students. This contains the names of 800 books, which are the best suited for the present use of students. Experience has taught the Librarian, that our students, especially those of the first year, are at a loss to know what books to select from the 5,600 upon the shelves. By making a special catalogue of 800 of the most important, the number becomes limited and very little mistake is made, if any one is selected.

Our Library now contains 5,690 volumes, of which 207 have been added this year. The books added may be grouped as follows:—

Reports, chiefly agricultural	80
Botany	7
Geology	1
Agriculture	22
Chemistry	14
Literature	19
Encyclopædias	9
General Science	3
Parliamentary reports	15
Examination papers, bound	1
Biography	8
History	23
Horticulture	5
	207

3. Reading-Room.

This is one of the most commodious and pleasant rooms in the College, and is becoming yearly more used for the purpose it was intended. It is well furnished for reading and study; excellent tables and chairs, and convenient reading desks, upon which are found the best agricultural journals published, a list of which is given below.

The following is a list of papers, journals and magazines which come to the College, and are for the use of the students in attendance:—

Papers and Magazines.

(a) *Sent free by the Publishers.*

	Name.	Where published.
1.	Journal of Commerce	Montreal.
2.	Canadian Baptist	Toronto
3.	Christian Guardian	"
4.	Canada Presbyterian	"
5.	Monthly Weather Review	"
6.	Presbyterian Review	"
7.	Sheep Breeder and Wool Grower	Chicago.
8.	Manitoba Weekly Free Press	Winnipeg.
9.	Canadian Horticulturist	St. Catharines.
10.	Canadian Entomoloist	London, Ont.
11.	Bee Journal	Beeton.
12.	North York Reformer	Newmarket.
13.	Acton Free Press	Acton.
14.	Ontario Evangelist	Erin, Ont.
15.	Evangelical Churchman	Toronto.
16.	Montreal Witness	Montreal.
17.	Farmers' Review	Chicago.
18.	Welland Tribune	Welland.
19.	Paris Transcript	Paris.
20.	Canadian Independent	Toronto.

(b) *Furnished by the College.*

	Name.	Where Published.
1.	Daily Globe	Toronto.
2.	" Mail	"
3.	" Empire	"
4.	" Mercury	Guelph.
5.	" Herald	"
6.	Rural Canadian	Toronto.
7.	Grip	"
8.	Poultry Review	"
9.	Farmers' Advocate	London, Ont.
10.	Canadian Stock Raisers' Journal	Toronto.
11.	Nor'-West Farmer	Winnipeg.
12.	Breeders' Gazette	Chicago.
13.	North British Agriculturist	Edinburgh (Scotland).
14.	Farmers' Gazette	Dublin (Ireland).
15.	Mark Lane Express	London (England).
16.	American Garden	Greenfield (Mass).
17.	American Naturalist	Philadelphia.
18.	Veterinary Journal	London (England).
19.	Veterinarian	"

Name.	Where published.
20. Cultivator and Country Gentleman	Albany, N.Y.
21. Scientific American	New York.
22. Live Stock Journal	England.
23. Live Stock Journal	Chicago.
24. American Dairyman	New York.
25. Botanical Gazette	Crawfordsville, Indiana
26. Agricultural Science	Geneva, N.Y.
27. Canadian Honey Producer	Brantford.
28. Literary Digest	Boston.
29. Entomological News	Philadelphia.
30. Canadian Agricultural and Home Magazine	Peterboro.
31. Hoard's Dairyman	Ft. Atkinson, Wis.
32. Maritime Agriculturist	New Brunswick.

4. Practical Work.

In the department of Natural History much has been done to make the study of science popular and practical. For use in the third year we have now some ninety-five drawings illustrating microscopic plants injurious to garden, orchard and field crops.

These are also drawn upon slides for the magic lantern, and can be used for instructive purposes.

On the canvas rust, blight, mildews, etc., appear like plants 4–7 feet in height. The diagrams and slides are arranged in the same order as the subjects are treated in the lecture-room.

This affords great aid to students and impresses lessons, which might soon be forgotten. We are constantly preparing slides for this purpose so that science will be illustrated on board, paper and canvas, and so presented as to be attractive, popular and instructive. In all we have upwards of 300 slides for the stereopticon, illustrating facts in Zoology, Botany and Geology.

In the spring of this year much time was occupied in completing the bed of plants used in connection with lectures in botany. This botanical instructive bed has become an important adjunct of the work in the class-room.

It is 224 feet in length and 15 feet in width. The rows containing the plants are 13 feet long, and a certain number of rows are set apart to illustrate typical plants in each order according as the order is large or small. Some orders have six rows, others only one, consequently a student knows at once whether the order is a common one or not by the number of plants set apart to illustrate it. In the Compositæ he sees 30, Ranunculacæ, 20, Papaveraceæ, 1, etc.

In the whole bed we have 40 orders, 275 genera and 550 species, which are arranged as follows :—

1. A systematic arrangement embracing 40 orders, 225 genera, 325 species.

2. A promiscuous arrangement embracing 225 species not grouped in orders. This is to test the student's knowledge of the orders to which the various plants belong.

3. An arrangement to illustrate the various methods of arranging plants in beds, such as carpet, mass, ribbon, and miscellaneous bedding.

Every plant is labelled so that students and visitors can readily identify them. In front of the first plant in each order the name of the order is indicated upon a large label. The divisions, polypetalous, gamopetalous and epetalous are also shown by larger labels The following is a list of the plants found in the first bed, illustrating the systematic arrangement of the flowers into orders as discoursed in the class-room :—

To James Goldie, Esq., of Guelph, we are much indebted for many of the plants that have enabled me to fill up what certainly would have been blanks, were it not for his generosity. Few men, if any, possess a garden with as many species as he, and we are very fortunate to be so near him, and have always found him ready to aid us along the ine of horticultural work.

ORDER I.

Polypetalous Exogens.

Ranunculaceæ (Crowfoot Family.)

Row 1—

1 Hepatica acutiloba ..... Liver-leaf.
2 H. triloba ..... Lobed "
3 Anemone pulsatilla ..... Pasque-flower.
4 A. nemorosa ..... Wood Anemomy.
5 Ranunculus acris ..... Buttercup.

Row 2—

1 Adonis vernalis ..... Spring Adonis.
2 Coptis trifoli ..... Goldthread.
3 Aconitum Napellus ..... Monkshood.
4 Pæonia tenuifolia ..... Cut-leaved Pæony.
5 P. officinalis ..... Pæony.

Row 3—

1 Aquilegia Canadensis ..... Columbine.
2 Thalictrium dioicium ..... Meadow Rue.
3 " speciosum .....
4 Aquilegia cærulea ..... Cærulean Columbine.
5 Delphinium splendens ..... Larkspur.

Row 4—

1 Clematis viorna ..... Clematis.
2 C. corymbosa ..... "
3 Helleborus-viridis ..... Hellebore.
4 Eranthis hyemalis ..... Winter Aconite.
5 Nigella Damascena ..... Love-in-the-mist.

ORDER II.

Berberidaceæ (Barberry F.).

Row 5—

1 Epimedium Alpinum ..... Epimedium.
2 Caulophyllum thalictroides ..... Blue Cohosh.
3 Podophyllum peltatum ..... Mandrake.
4 Epimedium .....
5 Berberis purpurea ..... Purple Barberry.

ORDER III.

Papaveraceæ (Poppy Family).

Row 6—

1 Sanguinaria Canadensis ..... Blood-root.
2 Papaver Orientalis ..... Poppy.
3 Chelidonium majus ..... Celandine.
4 Glaucum luteum ..... Horn Poppy.
5 Bocconia cordata ..... Bocconia.

ORDER IV.

Fumariaceæ (Fumitory F.).

Row 7—

1 Dicentra Canadensis ..... Squirrel-corn.
2 " Cucullaria ..... Deer-fly.
3 " spectabilis ..... Bleeding-heart.
4 Adlumia cirrhosa ..... Climbing Fumitory.
5 Corydalis aurea ..... Golden corydalis.

ORDER V.

Cruciferæ (Cress F.).

Row 8—

1 Iberis umbellata ..... Candytuft.
2 Brassica napus ..... Turnip.
3 Lepidium Virginicum ..... Pepperwort.
4 Arabis ..... Rock-cress.
5 Sinapis arvensis ..... Wild Mustard.

Row 9—

1 Sisymbrium officinale ..... Hedge Mustard.
2 Dentaria diphylla ..... Toothwort.
3 Lunaria biennis ..... Honesty.
4 Camelina sativa ..... False flax.
5 Sinapis alba ..... White Mustard.

Row 10 —

1 Alyssum maritinum ..... Sweet Alyssum.
2 Brassica oleracea ..... Cabbage.
3 Capsella Bursa pastoris ..... Shepherd's-purse.
4 Rhaphanus sativus ..... Radish.
5 Matthiola annua ..... Stock.

ORDER VI.

Violaceæ (Violet F..)

Row 11—

1 Viola pubescens ..... Yellow Violet.
2 " blanda ..... White "
3 " Canadensis ..... Canadian "
4 " culcullata ..... Common Blue Violet.
5 " tricolor ..... Pansy.

ORDER VII.

Caryophyllaceæ (Pink F.).

Row 12—

1 Cerastium arvense ..... F. Mouse-ear Chick-weed.
2 Tunica saxifraga ..... Tunica.
3 Dianthus deltoides ..... Deltoid Pink.
4 Lychnis vespertina ..... White Cockle.
5 Dianthus barbatus ..... Sweet William.

Row 13—

1 Cerastium vulgatum ..... Mouse-ear Chickweed.
2 Saponaria officinalis ..... Bouncing Bet.
3 Silene inflata ..... Bladder Campion.
4 Lychnis Githago ..... Cockle.
5 Dianthus Chinensis ..... China Pink.

Row 14—

1 Arenaria serpyllifolia ..... Thyme-lea'd Sandwort.
2 Saponaria Caucasia ..... Soapwort.
3 Spergula arvensis ..... Spurrey.
4 Stellaria media ..... Chickweed.
4 Lychnis diurna ..... Red Lychnis.

ORDER VIII.

Portulacaceæ (*Purslane F.*).

Row 15—

1 Claytonia Virginica ..... Spring Beauty.
2 Portulaca grandiflora ..... Portulaca.
3 " oleracea ..... Purslane.
4 " grandiflora ..... Portulaca.
5 Calandrina discolor ..... Calandrina.

ORDER IX.

Malvaceæ (*Mallow F.*).

Row 16—

1 Malva rotundifolia ..... Mallow.
2 Abutilion striatum ..... Indian Mallow.
3 Malope trifida ..... Malope.
4 Malva moschata ..... Musk Mallow.
5 Althaea rosea ..... Hollyhock.

ORDER X.

Linaceæ (*Flax F.*)

Row 17—

1 Linum flavum ..... Yellow Flax.
2 " grandiflorum ..... Red "
3 " usitatissimum ..... Common "
4 " perenne ..... Perrenial "
5 " usitatissimum ..... Common "

ORDER XI.

Geraniaceæ (*Geranium F.*).

Row 18—

1 Geranium sanguineum ..... Crimson Geranium.
2 Impatiens balsamina ..... Balsam
3 Oxalis versicolor ..... Sorrel.
4 Tropaeolum majus ..... Nasturtium.
5 Pelargonium cordatum ..... Pelargonium.

Row 19—

1	Tropaeolum majus	Nasturtium.
2	Geranium	Bronze Geranium.
3	"	Silver "
4	" Robertianum	Herb Robert.
5	" maculatum	Wild Geranium.

ORDER XII.

Leguminosæ (Pulse F.)

Row 20—

1	Lotus corniculatus	Bird's-foot Trefoil.
2	Vicia cracca	Wild Tare.
3	Pisum sativum	Pea.
4	Trifolium rubens	Crimson Clover.
5	Baptisia tinctoria	Wild False Indigo.

Row 21—

1	Medicago lupulina	Black Medick.
2	Trifolium arvense	Rabbit-foot Clover.
3	Medicago sativa	Lucerne.
4	Onobrychus sativa	Sainfoin.
5	Melilotus officinalis	Sweet Clover.

Row 22—

1	Trifolium repens	White Clover.
2	Trifolium pratense	Red "
3	Lathyrus latifolius	Everlasting Pea.
4	Vicia sativa	Tare.
5	Lupinus perennis	Lupine.

ORDER XIII.

Rosaceæ (Rose F.).

Row 23—

1	Waldsteinia fragaroides	Barren Strawberry.
2	Fragaria vesca	Wild "
3	Geum uniflorum	Avens.
4	Spiraea	Spiraea.
5	Rosa rugosa	Single Rose.

Row 24—

1	Potentilla argentea	Cinquefoil.
2	" verna	Green Cinquefoil.
3	" sulphurea	Yellow "
4	Spiraea	Spiraea.
5	Rubus strigosus	Raspberry.

ORDER XIV.

Saxitragaceæ (Saxifrage F.).

Row 25—

1	Saxifraga	Saxifrage
2	Mitella diphylla	Bishop's Cap.
3	Tiarella cordifolia	False Mitrewort.
4	Hydrangea hortensia	Hydrangea.
5	Ribes rubrum	Red Currant.

ORDER XV.

Crassulaceæ (Orpine F.).

Row 26—

1 Sedum acre ..... Stone-crop.
2 Sedum Telephinum ..... Live-forever
3 Sempervivum tectorum ..... House-leek.
4 Sedum ternatum .....
5 Sedum Sieboldii .....

ORDER XVI.

Onagraceæ (Evening-primrose F.)

Row 27—

1 Circaea lutetiana ..... Enchanter's Nightshade.
2 Fuchsia ..... Fuchsia.
3 Clarkia pulchella ..... Clarkia.
4 Oenothera biennis ..... Evening Primrose.
5 Epilobium angustifolium ..... Willow-herb.

ORDER XVII.

Umbelliferæ (Parsley F.)

Row 28—

1 Carum petroselinum ..... Parsley.
2 Apium graveolens ..... Celery.
3 Daucus carota ..... Carrot.
4 Pastinaca sativa ..... Parsnip.
5 Eryngium amethystinum ..... Eryngo.

ORDER XVIII.

Cucurbtaceæ (Gowad F.)

Row 29—

1 Cucurbita verrucosa ..... Vegetable marrow.
2 Cucumis melo ..... Musk-melon.
3 Cucumis melo ..... Cucumber.
4 Citrullus vulgaris ..... Water-melon.
5 Cucurbito pepo ..... Pumpkin

ORDER XIX.

Gamopetalous Exogens.

Compositæ (Composite F.)

Row 30—

1 Achillæa Millefolium ..... Yarrow.
2 Gaillardia grandiflora ..... Gaillardia.
3 Coreopsis .....
4 Achillæa filipendula ..... Golden Yarrow.
5 Ambrosia artemisæfolia ..... Ragweed.

Row 31—

1 Taraxacum officinale ..... Dandelion.
2 Senecio vulgaris ..... Groundsel.
3 Cineraria maritima ..... Cineraria.
4 Maruta cotula ..... Mayweed.
5 Pyrethrum roseum ..... Pink Feverfew.

Row 32—

1 Centaurea Cyanus ..... Bluebottle.
2 Tanacetum vulgare ..... Tansy.
3 Rudbeckia hirta ..... Cone-flower.
4 Anthemus tinctoria ..... Yellow Chamomile.
5 Solidago Canadensis ..... Goldenrod.

Row 33—

1 Bellis perennis ..... Daisy.
2 Leucanthemum vulgare ..... Ox-eye Daisy.
3 Arctium Lappa ..... Burdock.
4 Erigeron Philadelphicum ..... Fleabone.
5 Helianthus annuus ..... Sunflower.

Row 34—

1 Cirsium arvense ..... Thistle.
2 Hieracium auranticum ..... Hawkweed.
3 Echinops sphaerocephalus ..... Bee-plant.
4 Circium lanceolatum ..... Bull Thistle.
5 Chicorium Intybus ..... Chicory.

Row 35—

1 Sonchus oleraceus ..... Sow-thistle.
2 Gazania splendens ..... Gazania.
3 Gnaphalium polycephalum ..... Everlasting.
4 Dahlia variabilis ..... Dahlia.
5 Inula Helenium ..... Elecampane.

ORDER XX.

Lobeliaceæ (*Lobelia F.*)

Row 36—

1 Lobelia speciosa ..... Lobelia.
2 " " ..... "
3 " inflata ..... Indian Tobacco.
4 " syphilitica ..... Great Blue Lobelia.
5 " Cardinalis ..... Cardinal Flower.

ORDER XXI.

Campanulaceæ (*Campanula F.*).

Row 37—

1 Campanula Carpathica ..... Low Harebell.
2 " Americana ..... Tall Wild bell.
3 " medium ..... Cantebury Bell.
4 " latifolia .....
5 " rotundifolia ..... Harebell.

ORDER XXII.

Plantaginaceæ (Plantain F.).

Row 38—

1	Plantago	major	Plantain.
2	"	lanceolata	Ribgrass.
3	"	lanceolata	Ribgrass.
4	"	"	"
5	"	media	"

ORDER XXIII.

Primulaceæ (Primrose F.).

Row 39—

1	Primula	veris	Cowslip.
2	"	Sieboldi	
3	"		
4	Dodecatheon	Meadia	Shooting-star.
5	Lysimachia	vulgaris	Loose-strife.

ORDER XXIV.

Scrophulariaceæ (Figwort F.).

Row 40—

1	Veronica	peregrina	Neckweed.
2	Linaria	purpurea	Purple toadflax.
3	Mimulus	ringens	Monkey-flower.
4	Penstemon	pubescens	Penstemon.
5	Chelone	glabra	Turtle-head.

Row 41—

1	Pedicularis	Canadensis	Wood Betony.
2	Linaria	vulgaris	Toadflax.
3	Antirrhinum	majus	Snapdragon.
4	Digitalis	purpurea	Foxglove.
5	Verbascum	Thapsus	Mullein.

ORDER XXV.

Verbenaceæ (Vervian F.).

Row 42—

1	Verbena	venosa	Verbena.
2	"	"	"
3	Lantana	camara	Lantana.
4	Phryma	leptostachya	Lopseed.
5	Verbena	hastata	Vervian.

ORDER XXVI.

Labiatoæ (*Mint F.*).

Row 43—

1 Marrubum vulgare.....Horehound.
2 Perilla Nankinensis.....Perilla.
3 Coleus Veitchii.....Foliage Plant.
4 Salvia officinalis.....Sage.
5 Lavandula vera.....Lavander.

Row 44—

1 Thymus variegata.....Thyme.
2 Mentha viridis.....Spearmint.
3 Leonurus Cardiaca.....Motherwort.
4 Nepeta Cataria.....Catnip.
5 Monarda fistulosa.....Wild Bergamont.

ORDER XXVII.

Borragniaceæ (*Borage F.*).

Row 45—

1 Myosotis palustris.....Forget-me-not.
2 Cynoglossum officinalis.....Burr.
3 Echinospermum Lappula.....Stickseed.
4 Echium vulgare.....Blueweed.
5 Symphytum officinalis.....Comfrey.

Row 46—

1 Lithospermum arvense.....Redroot.
2 Heliotropium Peruvianum.....Heliotrope.
3 Borage officinalis.....Borage.
4 Anchusa officinalis.....Anchusa.
5 Lithospermum Arvense.....Pigeonweed.

ORDER XXVIII.

Polemoniaceæ (*Phlox F.*).

Row 47—

1 Phlox subulata.....Low Phlox.
2 " " ..... "
3 " divarieata.....Wild "
4 Gilia tricolor.....Gilia.
5 Polemnonium caeruleum.....Jacob's Ladder.

ORDER XXIX.

Convolvulaceæ (*Convolvulus F.*).

Row 48—

1 Convolvulus arvensis.....Bindweed.
2 Ipomaea purpurea.....Morning-glory.
3 C. arvensis.....
4 I. purpurea.....
5 " " .....

ORDER XXX.

Solanaceæ (Nightshade F.)

Row 49—

1 Petunia nyctaginfolia.....Petunia.
2 Datura fastuosa.....Datura.
3 Nicotiana rustica.....Tobacco.
4 Lycopersicum esculentum.....Tomato.
5 Solanum tuberosum.....Potato.

ORDER XXXI.

Asclepiadaceæ (Milkweed F.)

Row 50—

1 Asclepias tuberosa.....Butterfly-weed
2 .....
3 A. Cornuti.....Milkweed.
4 A. incarnata.....Swamp Milkweed.

ORDER XXXII.

APETALOUS EXOGENS.

Chenopodiaceæ (Goosefoot F.)

Row 51—

1 Blitum capitatum.....Strawberry Blite.
2 Spinosa oleracea.....Spinage.
3 Atriplex rubra.....Atriplex.
4 Beta Vulgaris.....Beet.
5 Chenopodium album.....Lamb's-quarters.

ORDER XXXIII.

Amarantaceæ (Aramanth F.)

Row 52—

1 Achyranthes.....Achyranthes.
2 Gomphrema globosa.....Everlasting.
3 Celosia cristata.....Cockscomb.
4 Iresine Lindeni.....Iresine.
5 Amarantus retroflexus.....Pigweed.

ORDER XXXIV.

Polygonaceæ (Buckwheat F.)

Row 53—

1 Polygonum aviculare.....Doorweed.
2 Rumex acetosella.....Sorrel.
3 Fagoyprrum esculentum.....Buckwheat.
4 Rumex crispus.....Dock.
5 Rheum Rhaponticum.....Rhubarb.

ORDER XXXV.

Euphorbiaceæ (*Spurge F.*)

Row 54—

1 Euphorbia maculata ..... Spotted spurge.
2 " hypericifolia .....
3 " Cyparissias ..... Cypress spurge.
4 .....
5 Ricinus communis ..... Castor-oil Plant.

ORDER XXXVI.

ENDOGENS.

Araceae (*Arum F.*)

Row 55—

1. Arisaema triphyllum ..... Indian Turnip.
2. Symplocarpus foetidus ..... Skunk Cabbage.
3. Acorus Calamus ..... Calamus.
4.
5. Calla Ethiopica ..... Calla Lily.

ORDER XXXVII.

Iridaceae (*Iris F.*)

Row 56—

1. Crocus vernus ..... Spring Crocus.
2. Gladiolus cardinalis ..... Gladiolus.
3. Paradanthus Chinensis ..... Blackberry Lily.
4. Sisyrinchium Bermudiana ..... Blue-eyed Grass.
5. Iris versicolor ..... Common Flag.

Row 57—

1. Iris arenaria ..... Flag.
2. " Sibirica ..... "
3. " Germanica ..... "
4. " fimbriata ..... "
5. " Persica ..... "

ORDER XXXVIII.

Lilaceae (*Lily F.*)

Row 58—

1. Convallaria majalis ..... Lily-of-the-Valley.
2. Tulipa Gesneriana ..... Tulip.
3. Scilla rosea ..... Scilla.
4. Uvularia grandiflora ..... Bellwort.
5. Yucca filamentosa ..... Yucca.

Row 59—

1. Erythronium Americanum ..... Dog-tooth Violet.
2. Polygonatum ..... Solomon's-seal.
3. Funkia variegata ..... Funkia.
4. Allium stellatum ..... Star Onion,
5. Lillium tigrinum ..... Tiger Lily.

Row 60—

1 Allium tricoccum ..... Leek.
2 Hyacinthus Orientalis ..... Hyacinth.
3 Trillium grandiflorum ..... Trillium.
4 Fritillaria ..... Fritillaria.
5 Lilium ..... Orange Lily.

ORDER XXXIX.

Amaryllidaceæ (*Amaryllis F.*).

Row 61—

1 Galanthus nivalis ..... Snowdrop.
2 Narcissus pseudo-narcissus ..... Daffodil.
3 Narcissus poeticus ..... Narcissus.
4 Polianthes tuberosa ..... Tuberose.
5 Agave Americana ..... American Aloe.

ORDER XL.

Gramineæ (*Grass F.*).

Row 62—

1 Festuca ovina ..... Sheep's Fescue.
2 T. pratensis ..... Meadow "
3
4 Dactylis glomerata ..... Orchard-grass.
5 Triticum repens ..... Couch-grass.

Row 63—

1 Poa pratensis ..... Kentucky Blue-grass.
2 P. Compressa ..... Wire-grass.
3 Phleum pratense ..... Timothy.
4 Alopecrus pratensis ..... Meadow Foxtail.
5 Setaria glanca ..... Com. Foxtail.

Row 64—

1 Panicum Crus-galli ..... Barnyard-grass.
2 Arrenatherum avenaceum ..... Tall Oat-grass.
3 Lolium perenne ..... Perennial Rye.
4 Bromus secalinus ..... Chess.
5 Avena fatua ..... Wild Oat.

Row 65—

1 Phalaris arundinacea ..... Ribbon-grass.
2 Hordeum vulgare ..... Barley.
3 Triticum vulgare ..... Wheat.
4 Avena sativa ..... Oat.
5 Zea Mays ..... Indian corn.

40 orders. 225 genera. 325 species.

Besides this collection we have undertaken to lay out a bed containing the most common wild flowers of Canada. A suitable place has been selected, and already many plants put in. This has been done with a view to familiarize our students with our wild flowers, many of which are very beautiful. Another, year will add much to the appearance of this practical bed of plants.

The following bulletins have been issued from the Natural History Department during 1890 :—

BULLETIN LII.—AGRICULTURAL COLLEGE.

GUELPH, JUNE 16, 1890.

BLACK-KNOT ON PLUMS.

In a late bulletin issued from the Bureau of Industries my attention was called to the fact that the black-knot upon plum-trees is very prevalent and appears to be spreading rapidly. This is easily accounted for when we understand the nature of the plant that causes it, and remember how little is done to check its progress by those upon whose trees it appears. The writer has on several occasions at Farmers' Institutes referred to this trouble and endeavored to show the necessity of united action being taken to extirpate it, or at least to some extent lessen its distribution. With a view to extend information regarding the cause and nature of this trouble to a large number of readers this Bulletin is written.

LIFE HISTORY OF THE FUNGUS.—An examination of the knot in its earliest stages shows innumerable small, transparent threads, only seen by aid of the microscope. They branch among the cells which compose the tissue of the inner bark of the tree, and form the so-called *mycelium* or vegetable part of the fungus. The threads become very intricately twisted together in bundles as development proceeds, beginning in the growing layer of the bark and radiating outwards. As spring advances, the threads increase and reach a more matured condition. As growth proceeds, the knot assumes a velvety appearance ; this is the result of the threadlike structures sending off many short-jointed filaments, on the ends of which are borne egg-shaped spores known as *conidiospores*. These are very small, requiring the aid of a microscope to see them. When ripe, they are readily disturbed, may be blown by the wind and thus reach new starting points so as to give rise to knots similar to that upon which they were developed. This mode of reproduction in the "knot" continues till the summer is well advanced, when another class of spores begins to develop, and which reach maturity about February. The surface of the knot during winter shows spores that can be seen by the naked eye ; these open into cavities, on the walls of which are two kinds of structures, one consisting of slender filaments (*paraphyses*) the use of which is not known ; the other club-shaped (*asci*). In the *asci* towards the close of winter *ascospores* are developed, usually eight in each *ascus*, out of which the spores come through an opening at the end ; these spores become new starting points for the parisitic plant, when they reach proper conditions for development. Other cavities also are found among those with the *asci* ; these contain very minute oval spores divided by cross partitions into three parts, and borne on slender stalks. These are called *stylospores*, the use of which is not known, but they are generally believed to be concerned in the perpetuation of the species. Still other cavities exist containing slender filaments (*spermatia*) which also seem to be concerned in reproduction. Besides the cavities referred to, sometimes spaces more flattened than these, and in some cases showing a triangular form, appear ; they are lined with short, delicate filaments that end in a minute oval body. These bodies are produced in great numbers and are discharged in masses, being held together by a sort of jelly. They have been called *Pycnidiospores*, and also seem to be connected with the perpetuation of the fungus.

REPRODUCTIVE ORGANS.—In the case of this parasitic plant we have then five kinds of reproductive organs, viz. : conidiospores, ascospores, stylospores, spermatia and pycnidiospores, all more or less connected with the spread of the fungus. Until the true nature of this fungus became known it was generally believed that the "knots" were caused by insects, but since the life history of the plant has been made out the insect theory has been abandoned. The following objections may be made against it : (1) The knots do not resemble galls made by insects. (2) Insects may be found in old knots, but seldom, if ever,

in young. (3) The insects are of various species, some of which are found on trees where knots never occur. (4) Wherever the knot is found the fungus described invariably is present, and is never seen, but associated with the knot and can be observed in the stem before anything like a knot is visible.

REMEDIES.

1. Hitherto most orchardists have found the best thing to do is to cut off affected limbs and destroy them. Where a tree is badly attacked, destroy the whole tree.

2. Some experiments in applying linseed oil to the knots with a small brush so as to saturate the knot have been effective. This is done three or four times during the summer, as soon as the knots appear.

3. Coal oil may be used, but it must be applied carefully. If it runs over the branch it will kill it.

4. Wild choke-cherry trees near orchards should be destroyed. It is unfortunate that so little regard is paid to the law which requires affected trees to be destroyed. These trees are scattering millions of spores yearly, and thus spreading the disease to all parts of the Province. Blighted trees stand as monuments of the indifference and ignorance of those who should co-operate in fighting against a common foe.

BULLETIN LVI.—AGRICULTURAL COLLEGE.

GUELPH, DECEMBER 9, 1890.

SMUT: ITS HABITS AND REMEDIES.

Smut is a disease well known to farmers, and though good remedies have been found to prevent it, yet there are many ignorant of them if we judge from the number of questions sent to the College on the subject. As there are several varieties of smut, we shall consider the habits of some of the most common, and then give some remedies.

TILLETIA CARIES (*Bunt or Stinking Smut*).—When wheat is affected by this variety the grains are shorter and more swollen than usual, and present a greenish-drab color. Sometimes they are cracked. These affected grains are completely filled with minute round black spores, having an unpleasant smell, and presenting under the microscope a somewhat roughened appearance. They are much larger than the spores of the common smut. When they reach favorable conditions, heat and moisture, germination takes place, and a series of reproductive bodies result, which give rise to the vegetative portion of the fungus. This is an exceedingly slender jointed thread that ultimately bears perfect spores in the wheat plant after reaching the seed. These reproductive bodies, called sporidea or sporules, are produced outside of the wheat plant, but when they come in contact with the young host they find their way into its tissues, and running up the stem between the cells, they finally reach the seed, and bear spores on tiny stalks. It has been calculated that one grain may contain 40,000,000 spores, inclosed within the thin skin, and not exposed, as in the common smut of wheat and oats.

USTILAGO CARBO (*Common or Loose Smut*).—In cases of attack from this form, the affected plants are readily observed, as it shows itself very distinctly by covering the ear with smut. The spores have no bad odor and are exceedingly minnte, being much smaller than those of *Bunt*. When they reach favorable conditions, germination takes place, and reproductive structures result; these, as in *Bunt*, give rise to the vegetative portion of the fungus which reaches the young plant, and a course is followed, much the same as in *Bunt*. Investigation indicates that the trouble in plants attacked comes from the ground and travels upwards; that the results of the attack manifest themselves in the head, and especially in the grain; that seed, dusty from smut, results in much of the grain being smutty.

Ustilago zeæ-mays (*Corn Smut*).—In this case the smut is not so local as in the preceding. The affected parts are not confined to the ear alone, but sometimes are found elsewhere. The spores form inside of the threads of the vegetative structure, and not upon little stalks, as in the other smut, and thus are widely different in development. When the spores germinate they give rise to a sort of tube-like structure in which several cross partitions are formed and the tube divides into cells. At the tip of these sporules form; they germinate singly and produce structures that may penetrate the tissues of the corn plant at its most tender point (the lowest joint of the stem), when the plant is young. During the growing period of the fungus, up to the time when spore formation takes place, it consists only of that portion which necessarily begins its growth near the surface of the ground, since it enters when the corn is very young. As the plant increases the fungus grows upwards to the place where it forms spores. The fruiting time of the corn marks also the period when spores are developed, usually upon the young kernels. About this time the thread-like structures branch where spores are to be formed. The tips of the branching threads swell, and granules appear in the contents. These finally develop into spores imbedded in the substance within the threads; the cell walls become gelatinous as spore formation proceeds, and this gives a slimy character to the mass of smut; but in the course of time, further changes take place, and very little remains but dry, round, dusty spores. It is injurious to feed cattle with smutty corn, as it acts upon the animal economy much the same as ergot of rye. Passing through the animal system does not destroy the germinating power of smut, consequently the spores in manure are in a condition to spread the trouble. As it is readily seen on affected parts and may be picked off, it should be gathered and destroyed by fire or otherwise. It is not sufficient to pick off the smut and throw it upon the ground, as the spores will still continue to form.

Remedies.—With such facts before us we are in a position to suggest some remedies, which are applicable to the several varieties of smut:

1. Sow clean seed.

2. Steep seed five minutes in a solution of copper sulphate (1 lb. to 1 gallon of water); constantly stir so as to wet the grain evenly; then spread it on a floor to dry, or add some land plaster or slacked lime, and mix until dry. One gallon is about enough for 4 bushels. Some prefer using a weaker solution and allowing a longer time: *e.g.*, 1 lb. copper sulphate to 4 gallons of water, and steep twenty-four hours.

3. 1 lb. caustic potash in 6 gallons of water; let soak a day. Or take 40 lb. hard-wood ashes to 10 gallons water; let this stand a day, stirring from time to time, and the water poured off will be a solution about the same strength as the preceding.

4. Brine strong enough to float an egg does very well if the seed is kept in it for several hours with occasional stirring.

5. Immersing the grain in hot water (135° F.) for 5 minutes, or 132° F. for 15 minutes, destroys smut spores without injury to the grain. A temperature 5° above or below this fails in its results.

By keeping the seed in a sack made of coarse material it may be readily dipped into any of the solutions recommended.

In the department of Natural History we are constantly adding improvements so as to render the teaching of this subject attractive. We are now able to use the stereopticon in the class-room during the day. Hitherto we used it in the evening only, but we have had curtains put upon the windows so that the room can be darkened at any time.

We have under consideration now an arrangement by which we shall be able to use the lime-light instead of the ordinary oil lamp. This will enable us to throw upon the screen, objects in the microscope, without requiring to have specially prepared slides for the lantern. This will be a great step in advance, and at once place us in a position to use apparatus of great use in teaching botany and allied subjects. The expense will be about fifty dollars, and all the fixtures will be of use in a new laboratory when such is built. We think the time has arrived when a new greenhouse should be erected, and in connection with it a lecture-room, etc., for the use of the students in botany. Every department has had much money spent upon it except this, and we have patiently waited, hoping the time would soon come when the equipment of the botanical

department would equal that of the chemical. Our institution should have it, in fact, there are some high schools able to boast of instruments we have not been able to get yet, owing to the want of suitable accommodation.

During the present year an additional orchard has been laid out. It was found that field 10 was poorly adapted for fruit-growing, and that the time had arrived to try another location. About six acres were selected in field 13, where the soil seems favorable and naturally well drained. The following trees, etc., have been planted :

Apples.

Northern Spy, 12 ; Walbridge, 17 ; Fameuse, 10 ; Duchess of Oldenburg, 7 ; Yellow Bellflower, 7 ; Wealthy, 6 ; Golden Russet, 5 ; Wagener, 5 ; Yellow Transparent, 5 ; Magog Red Streak, 5 ; St. Lawrence, 5 ; Colvert, 5 ; Red Astrachan, 5 ; Ben Davis, 3 ; Ribston Pippin, 3 ; Alexander, 3 ; Bailey's Sweet, 2 ; Salome, 1 ; Aucubifolia, 1 ; Russian Apples, Nos. 60, 182, 270, 322, 599.

Pears.

Ritson, 10 ; Beurre Hardy, 2 ; Beurre de Anjou, 2 ; Sheldon, 2 ; Flemish Beauty, 2 ; Clapp's Favorite, 2.

Grape Vines.

Worden, 30 ; Salem, 30 ; Moore's Early, 14 ; Delaware, 10 ; Lady, 10 ; Red Wyoming, 10 ; Early Victor, 5 ; Moyer, 5 ; Rogers No. 4, 5 ; Montgomery Red, 4 ; Agawam, 4 ; Concord, 3 ; Brighton, 3 ; Rogers No. 28, 2 ; Lindley, 2.

Raspberries.

Cuthbert, 325 ; Philadelphia, 220 ; Marlboro, 120 ; Golden Queen, 50 : Hilborn, 50 ; Tyler, 50.

Currants.

White Grape, 50 ; Fay's Prolific, 50 ; Cherry, 27 ; Champion, 24 ; Lee's Prolific, 50 ; Naples, 25 ; Saunder's Seedling, 45.

Gooseberries.

Downing, 75 ; Houghton, 50 ; Whitesmith, 45 ; Industry, 25 ; Smith's Improved, 25 ; Pearl, 25.

Strawberries.

Dominion, 500 ; Crescent Seedling, 500 ; Wilson's Albany, 230 ; Manchester, 150 ; Clouds, 150 ; Rubach, 130 ; Haverland, 50 ; Jessie, 60 ; Sharpless, 60.

About four acres on the east side of Field 4 has been laid out with forest trees, embracing the following kinds :—Ash, Maple, Hickory, Birch, Mountain Ash, American Chestnut, Walnut, Sycamore, Catalpa and Austrian Pine. This has been done with a view to learn something regarding the effect of cultivation upon trees of this class.

Our former vineyard in Field 17 has been reduced to about two acres, these containing none but the hardiest varieties. In the old vineyard we had some 96 varieties, but experience has taught us that only a limited number will ripen with us and these are retained. The others are destroyed, and that portion of the vineyard devoted to other crops.

Our clumps of Larch, Walnut and mixed collections are doing well. The hedge plants and trees grown in the nursery, situated in the corner of the Experimental Field, are also progressing favourably. From these we are able to remove from time to time trees and shrubs to other parts where required.

METEOROLOGY.

Report of Observations taken at the Ontario Agricultural College during 1890.

Observations are regularly taken at the hours of 7 a.m., 1 p.m., and 9 p.m. daily, and recorded in a book printed for the purpose. The instruments in use are as follows :—

Anemometer—Recording the direction of the wind and indicating the number of miles travelled. During the greater part of '89 this has been out of order.

Barometer—Showing the atmospheric pressure at the time of observation.

Maxium thermometer—Indicating the highest temperature between times of observation.

Minimum thermometer—Indicating the lowest temperature between times of observation.

Hygrometer—With *dry* and *wet* bulb thermometer, for the purpose of showing the condition of the atmosphere with reference to moisture.

Pluviameter—Used in measuring the rainfall.

Thermometer—For observing ordinary temperature.

Besides taking observations from these instruments, the cloudiness of the sky is observed, and general remarks on the weather for the day are recorded in the daily register. At the close of each month a summary of the month's observations is made out. From these monthly summaries the condensed statement of the year's meteorology is made up.

Form of Monthly Summary.

Meteorology.

A summary of the meteorological observations taken at Ontario Agricultural College during the month of.....

Normal height of barometer at Guelph (1,100 feet above sea level and 858 feet above Lake Ontario, 28.86 inches. Latitude north 43°-38'.

Barometer—

Highest barometer.
Lowest "
Highest mean barometer.
Lowest " "
Monthly " "
Monthly range.

Thermometer—

Highest thermometer.
Lowest "
Highest mean thermometer.
Lowest " "
Monthly " "
Monthly range.

Pluviameter—

Days rain fell.
Greatest rainfall.
Days snow fell.
Greatest snowfall.
Total precipitation.

Anemometer—

Direction of wind.
Greatest number of miles travelled in twenty-four hours.
Greatest velocity per hour.
Mean velocity per month.

Summary of the Meteorological Results for 1890.

—	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.
Barometer—	inches.	inches.	inches.	inches.	inches.	inches.	inches.	inches.	inches.	inches.	inches.	inches.
Highest barometer	29.474	29.342	29.270	29.294	29.038	29.140	29.958	29.910	29.192	29.128	29.600	29.960
Lowest barometer	28.116	28.213	28.134	28.054	28.362	28.600	28.600	28.400	28.622	28.126	28.100	28.218
Highest mean barometer	29.415	29.260	29.186	29.260	28.955	29.124	29.256	29.151	29.192	29.100	29.341	29.276
Lowest mean barometer	28.426	28.408	28.154	28.175	28.520	28.610	28.672	28.615	28.706	28.176	28.545	28.275
Monthly mean barometer	28.938	28.056	28.779	28.101	28.273	28.844	28.882	28.896	28.944	28.514	28.943	28.783
Monthly range	1.358	1.129	1.136	1.240	.676	.540	1.358	1.470	.570	1.002	1.600	1.742
Thermometer.	degrees.	degrees.	degrees.	degrees.	degrees.	degrees.	degrees.	degrees.	degrees.	degrees.	degrees.	degrees.
Highest temperature	65.0	3.7	5.2	74.0	75.5	89.9	.....	104.3	89.3	75.8	71.2	55.5
Lowest temperature	10.0	.5	.9	19.0	25.0	35.6	43.5	39.4	30.0	26.0	20.5	-4.0
Highest mean temperature	43.0	35.5	31.1	.....	63.3	75.3	75.6	75.7	71.6	60.4	47.9	31.7
Lowest mean temperature	11.3	11.9	11.1	.....	39.7	51.8	55.4	49.4	42.6	33.0	19.7	6.4
Monthly mean temperature	26.4	26.3	24.9	.....	49.9	73.4	66.0	61.9	55.9	44.5	34.8	25.5
Monthly range	55.0	52.0	51.1	55.0	50.5	54.3	66.5	68.9	59.3	49.8	50.7	59.5
Pluviameter.												
Number days rain fell	2	2	.....	.....	1	9	8	6	7	11	10	1
Number days snow fell	3	.....	1	.....	.....	.....	.....	.....	.....	.....	2	1.5
Greatest rainfall, inches	1.14	7	.....	.....	.21	1.36	.47	.69	.29	.43	1.45	.....
Rainfall for month, inches	1.53	1.10	.....	.....	.21	4.96	1.45	1.32	.58	1.91	3.16	.....
Greatest snowfall, inches	1.5	.....	1	.....	.....	.....	.....	.....	.....	.....	1.75	3.00
Snowfall for month, inches	3.3	.....	1	.....	.....	.....	.....	.....	.....	.....	2.80	7.5
Total precipitation	1.86	1.10	.1	.....	.21	4.96	1.43	1.32	.58	1.97	3.44	.75
Anemometer.												
Predominating winds	Not in running order.											
Greatest number of miles in 24 hours												
Mean velocity for the month												

With reference to the subjects discussed in the lectures delivered during the year it is unnecessary to give an outline of the work, as that is shown in that portion of your report which gives a syllabus of the subjects taught in each Department. In conclusion I would direct your attention more particularly to what are the pressing wants of the Natural History Department.

1. The construction of gas cylinders in the Botanical Laboratory at an expenditure of not more than fifty dollars.

2. The purchase of four additional microscopes at an expense of one hundred dollars. This results from the increased attendance in the third year.

3. The purchase of specimens for the Museum, for which at least one hundred dollars should be granted.

4. The erection of a new greenhouse, and in connection with it a Botanical Laboratory, Lecture-room and suitable accommodation for students in Microscopy. Owing to our limited quarters this year I have been necessitated to divide the claas in practical work, and thus have been employed alternate afternoons with classes doing the same work. We certainly are much in need of accommodation in this direction, and it is hoped you will be able to prevail upon those who have it in their power to put us on an equal footing with other institutions as far as this Department is concerned.

Your obedient servant,

J. HOYES PANTON.

PART III.

REPORT OF

THE PROFESSOR OF CHEMISTRY.

To the President of the Ontario Agricultural College:

Sir,—I beg herewith to submit to you my report of the work done at the Chemical Laboratory during the year 1890. As my details of analysis, etc., are somewhat extensive I shall condense my remarks in this introduction to as brief a space as possible.

My chief report in regard to instruction is in reference to the elementary work with the first year. For the first time we have attempted the teaching of this class in a thoroughly practical manner. Instead of lectures only we now have two afternoons during the week given to laboratory practice, supplemented by one lecture each week. In a word, I may say that I am more than ever satisfied that, though a little more expensive, this is the only satisfactory manner of imparting instruction in this subject. When we have covered an entire year's work with this class I shall be able to report to you more fully as to the general effect. The increase of work thus resulting demands increased room, apparatus and attention from the chemical department; but in all these respects I trust that by the liberal aid of the management we shall, during the coming year, be more fully equipped.

Through your kindness in arranging for my summer duty I was enabled to spend part of the summer of the past year in the organic department of the chemical laboratory of Harvard University. I would suggest that in no surer way can the controlling power of this institution increase its usefulness and create a feeling of enthusiasm and energy on the part of the staff than by making it possible for the various members of its staff to regularly visit and spend some time in the leading laboratories and experimental stations of America and Europe.

I submit my report to you under the following five heads in order

1. Fodder Corn, and Corn for Ensilage.
2. Corn Ensilage.
3. Report on Fish and Fish Refuse.
4. Sugar Beets.
5. Soil Temperatures and Drainage Waters.

Fodder Corn and Corn for Ensilage.

At the beginning of 1890 extensive analysis of samples of corn grown by Prof. Robertson in connection with the dairy department were in progress. These were partially completed and reported upon to him early in January. Since then the unfinished work has been overtaken and I here present our complete analysis in this undertaking. Those who may be interested in this will find by reference to pp. 196-202 Report of Ontario Agricultural College and Experimental Farm for 1889, much that will prove interesting and valuable as supplementary to this. Messrs. Zavitz, Harcourt and Lehmann have been engaged at various stages of this work, which has required an immense amount of time and careful labor. There are in all forty-one results given which are the averages in each case of two closely agreeing duplicates, so that in all eighty-two samples of corn were analyzed.

First—I shall give the composition of the *Field Corn*, which was divided into three classes, according to size, viz., small, medium and large. Each of these classes is separated as shewn, according to the stage of maturity, and these further subdivided for analysis into leaves, stalks and ears. The names of the varieties are given which were in every case thoroughly mixed together before being analyzed.

TABLE I.

Field Corn.

Chemical Analysis of Fodder Corns Grouped together.

		Varieties of Corn in each group.	Chemical analysis of each group.						
				Water.	Crude Protein.	Fat or Ether Extract.	Soluble Carbo-hydrates.	Crude Fibre.	Ash.
SMALL.	"Out of bloom" and "Early milk stage."	Pearce's Prolific Stabler's 2nd Early Tuscarora Golden Dew Drop	Ears....	67.58	2.53	1.14	24.08	4.41	.26
		Golden Dew Drop Longfellow Angel of Midnight Self Musking	Stalks...	73.38	1.79	.57	16.42	7.46	.38
		100 Day Corn Crosby Sweet Fodder Hickox, Sweet	Leaves..	33.02	5.53	1.75	37.18	18.78	3.74
	"Silking stage."	North Star Yellow Dent	Ears....	72.25	3.04	.99	20.73	2.77	.22
			Stalks .	73.90	2.37	.62	15.66	7.13	.32
		Egyptian Sweet	Leaves..	25.73	8.48	1.99	38.19	21.32	4.29
MEDIUM.	"Out of bloom" and "Early milk stage."	White Flint Longfellow Early Adams or Burlington Wisconsin White Flint Pride of the North Calico Dent	Ears....	66.23	2.79	1.13	25.17	4.39	.29
		Edmunds Premium Dent Wisconsin White Flint Longfellow Flint Corn King Phillip Flint Canada Yellow Horse Tooth	Stalks..	70.71	1.28	.95	20.40	6.32	.34
		Early White Flint Compton's Early Evergreen Sweet Asylum Sweet Sibley's Pride of the North	Leaves..	31.53	5.60	1.66	38.87	18.49	3.85
	"Silking stage."	Brazilian Flour Corn	Ears ...	78.68	2.20	.53	16.72	1.70	.17
		Wisconsin Yellow Dent	Stalks..	69.32	1.80	1.30	19.31	7.92	.35
		Woodsworth's Yellow Dent	Leaves..	33.03	5.56	1.49	38.91	18.01	3.20
	"Out of bloom and "Early milk stage."	Chester No. Mammoth	Ears ...	75.01	2.03	.17	18.25	3.75	.19
			Stalks..	75.86	1.19	.61	15.11	6.98	.25
		Giant Prolific Sweet Ensilage	Leaves .	26.17	7.38	1.81	41.44	18.65	4.55
LARGE.	"Silking stage."	Horse Tooth Cranberry White Dent Leaming Dent	Ears ...	78.90	2.01	.70	15.95	2.27	.17
		Garrish White Dent Hickory King South Western	Stalks..	71.65	1.77	.93	16.93	8.43	.29
		Sheep's Tooth White Western Red Bob M. S. S.	Leaves..	32.34	7.22	1.92	38.85	16.07	3.60

Conclusions.

1. In fodder corns the water is greatest in the stalks, least in the leaves, more than twice as much being found in the former as in the latter. The water in these samples appears to have increased with age in ears and leaves and decreased in stalks; but too much reliance cannot be placed on this last conclusion as the varieties are to a great extent quite different.

2. The nitrogenous material or crude protein is greatest in the leaves and least in the stalks, the difference being greater the larger the plant. In immature plants such as these a large portion of the nitrogenous compound is of an inferior nature, chemically known as *non-protein*, which as the plant matures becomes changed into true protein or muscle and flesh forming material.

3. By fat we more correctly mean ether-extract, everything that can be dissolved out of the dried substance by ether. In addition to fats or oils, the ether readily dissolves gummy substances and chlorophyl, and, as fat or oil is not one of the compounds formed in the early stages of plant growth, these figures are controlled to a great extent by the greenness of the plant. The excess in the leaves of this constituent is thus explained: Fodder corns of all kinds contain little, if any, true fat.

4. By soluble carbohydrates we mean starch, sugar and the readily digestible portion of the woody fibre. In this respect again the leaves have the large percentage, about double that of the stalks.

5. In crude fibre the order of percentage in every case is leaves, ears, stalks.

6. As the leaves are the manufacturing headquarters of the plant and also the avenues of ash excretion to a great extent, we here find the great excess of the ash or mineral matter.

7. Pound for pound the three parts of these plants are to be valued in this order leaves first, then ears, then stalks.

TABLE II.

Hill Corn.

Chemical Analysis of Fodder Corns Grouped together.

SMALL. "Out of bloom" and "Early milk stage."	Varieties of Corn in each Group.		Chemical Analysis of each Group.					
			Water	Crude Protein.	Fat Ether (Extract.)	Soluble Carbohydrates.	Crude Fibre.	Ash.
	Longfellow Smutt Nose Flint Sweet Fodder Crosby Corn Moore's Early Concord Early Mammoth Livingstone's Evergreen	Ears....	71.93	2.52	.95	19.23	5.12	.25
	Pee & Kay Corn Late Mammoth Sugar Stowell's Evergreen Early Minnesota Black Mexican Hickox Sweet	Stalks...	75.73	1.40	.65	14.59	7 32	.32
	Pearce's Prolific Golden Dewdrop Canada Yellow Self Husking White Flint	Leaves..	37.18	6.12	1.11	35.49	16.56	3.54

TABLE II.—*Continued.*

		Varieties of Corn in each Group.		Chemical Analysis of each Group.					
				Water.	Crude Protein.	Fat Ether (Extract.)	Soluble Carbohydrates.	Crude Fibre.	Ash.
SMALL.	"Silking stage."	Triumph Asylum Sweet	Ears ...	83.22	1.65	.59	15.88	1.56	.10
		Japanese Maize Old Colony	Stalks..	78.05	1.45	.52	13.46	6.28	.24
		Brazilian Flour Corn Tuscarora	Leaves..	44.94	8.05	1.35	26.99	16.09	2.58
MEDIUM.	"Out of bloom and "Early milk stage."	Woodsworth's Yellow Dent Pride of the North No. 23 Wisconsin Yellow Dent Wisconsin White Dent	Ears ...	66.73	2.70	.72	25.31	4.25	.29
		Calico Dent King Phillip Wisconsin White Flint Sibley's Pride of the North Stabler's 2nd Early	Stalks..	72.31	1.26	.63	17.13	8.35	.32
		Early Adams or Burlington Horse Tooth 100 Day Corn Compton's Early	Leaves..	29.63	6.07	1.51	39.37	19.35	4.07
	"Silking stage."	Leaming Yellow Dent	Ears ...	87.66	1.60	.53	8.50	1.64	.07
		Thoroughbred Flint Egyptian Sweet Evergreen Sweet	Stalks..	73.59	1.53	.74	15.60	8.28	.26
		Giant White Southern	Leaves..	29.92	7.48	1.38	37.89	19.22	4.11
LARGE.	"Out of bloom and "Early milk stage."	Stimpson's Yellow Dent	Ears ...	78.68	2.01	.43	15.21	3.51	.16
		Edmund's Premium Dent	Stalks..	71.00	1.00	.89	18.27	8.52	.32
		Chester County Mammoth	Leaves..	20.27	7.97	1.69	43.84	21.22	5.01
	"Silking stage."	Garrish White Dent Hickory King Cranberry Dent	Ears ...	82.26	3.91	.67	9.82	3.19	.15
		North Star Yellow Dent Red Cob Ensilage Giant Prolific S. E...	Slalks..	72.35	3.45	.54	14.81	8.54	.31
		M. S. S. Sheep's Tooth South Western White Western	Leaves..	38.75	10.84	1.33	29.88	15 94	3.26

General Conclusion.

As in the case of the field corn, we here find that the leaves contain less water and more crude protein, soluble carbohydrates, fibre and ash, than the stalks or young ears.

TABLE III.

ENSILAGE CORNS.—(DRILLS 3 FEET APART.)

This investigation was carried out in connection with five varieties, as stated in the following table. 160 plants were taken weighing in green state 300.75 lb., in dry condition, 169.18 lb. These, therefore, in drying, lost in water 131.57 lb. or 43.7 per cent. of the entire weight. This table gives the analysis calculated to their green condition :

Varieties.		Water.	Crude Protein.	Ether Extract.	Soluble Carbohydrates.	Crude Fibre.	Ash.
M. S. S.							
Red Cob Ensilage.....	Ears	8.82	1.63	0.49	13.98	2.97	0.11
Grand Prolific S, Ens.	Stalks	72.87	1.25	0.58	16.69	8.35	0.26
Pearce's Prolific.....	Leaves	28.14	6.87	1.52	40.37	18.82	4.28
Sibley's Pride of N....							

The entire crop was made up as follows, by weight :

Ears	19.1	per cent.
Stalks	60.5	"
Leaves	20.4	"

So that reckoned to pounds, a ton of such corn would contain : ears, 38.2 lb. ; stalks, 1210 lb. ; leaves, 408 ; made up as follows :

Pounds per ton of Green Crop.

——	Water.	Crude Protein.	Ether Extract.	Soluble Carbohydrates.	Crude Fibre	
Ears	308.73	6.22	1.87	53.41	11.35	0.42
Stalks.....	881.73	15.12	7.02	201.95	101 04	3.14
Leaves	114 81	28.03	6.20	164.71	76.79	17.46
Total	1305.27	49.37	15.09	420.07	189.18	21.02

Percentage, distribution of the different constituents in various parts.

—— ——	Water.	Protein.	Ether Extract.	Carbohydrates.	Fibre.	Ash.
Ears	23.6	12.6	12.4	12.7	6.1	2.0
Stalks	67.5	30.6	46 5	48.0	53.3	15.0
Leaves	8.9	56.8	41.1	39.3	40.6	83.0

Composition of entire Green Plant.

Water	65 26 per cent.
Crude Protein	2.46 "
Ether Extract	9.75 "
Starch, sugar, etc	21.00 "
Crude Fibre	9.45 "
Ash	1.05 "
	99.97

From the above tables it will be seen how large a portion of valuable food is stored up or contained in the leaf. Two-thirds of the water is found in the stalk; more than half of the crude protein is in the leaf; the starch, sugar and fibre are in the stalk and leaf in about the proportions of five to four; over four-fifths of the ash or mineral matter (bone material) is contained in the leaf. The high feeding and fertilizing value of the leaf of the fodder is thus demonstrated.

TABLE IV.

Broadcasted Corn.

Forty stalks of four varieties grown broadcast were separated into leaf and stalk, and duplicate analyses made of the samples, thus obtained:

Varieties.		Water.	Crude Protein.	Ether Extract.	Soluble Carbohydrates.	Crude Fibre.	Ash.
M. S. S							
Red Cob Ensilage	Stalks	65.49	0.97	0.65	23.66	8.86	0.37
Giant Prolific S. Ens.	Leaves	26.15	4.48	16.5	42.08	21.85	3.79
Pearce's Prolific							

The former conclusions are at once found to hold true here also, in comparing leaf with stalk. The high feeding and manurial value of the leaf is thus shown in all varieties of fodder and ensilage corn, at all stages, and in broadcast and drill treatment.

CORN ENSILAGE.

The corn produced at the farm here during the year 1889 and fed during the winter of '89 90 was placed in two silos, one situated at the dairy barn and one at the large farm barn. The corn was of a varied nature and of varied degrees of maturity, as it had been grown for experimental purposes to test both variety and method of growing. The result was that the quality was not quite equal to the average, as the analysis given in the following table shows :

——	Water.	Crude Protein.	Fat, or Ether Extract.	Soluble Carbohydrates.	Crude Fibre.	Ash.
Dairy ensilage	81.72	1 06	0 73	11 52	3.93	1.04
Farm ensilage	81 47	1.18	1.12	10.82	4.30	1.11

The question arises at once as to how this compares with the average, the best and the worst. That this may be seen, and that the possible variations in the composition of corn ensilage may be seen, I give the average of 100 samples, also the maximum and minimum amounts of the different constituents as given by Dr. Jenkins of Connecticut :

——	Water.	Crude Protein.	Fat, or Ether Extract.	Soluble Carbohydrates.	Crude Fibre.	Ash.
Average	79.83	1.59	0.73	10.62	5.94	1.29
Minimum	64.40	0.70	0.20	5.10	3.00	
Maximum	87.00	2.80	1.80	22.20	10.00	

Investigation Elsewhere.

During the past year the experimental stations in connection with nineteen of the neighboring states have been investigating the ensilage and corn question, whilst in England, France and Germany much valuable work has been carried on of late years. The most important conclusions from these places have been embodied in reports and bulletins, and I propose to select the most valuable results and include them in this bulletin for the information of the farmers of Ontario. The name of the state or station will in this work sufficiently indicate the source of selections.

VARIETY OF CORN.

"Those varieties that will reach a fair degree of maturity are the best for fodder and ensilage purposes."—(*Cornell, New York*, 1889.)

"It is now generally believed that the more mature the grain while the stalk remains green, the better the ensilage will be. So that early maturing varieties are now considered most valuable."—(*Michigan*, 1889.)

For conclusions from an Ontario experiment see Ontario Agricultural College and Ontario Experimental Farm report for 1889, page 202, (Prof. Robertson's report.)

Method of Growing.

The general conclusion of experiments at all stations, based on chemical analysis and actual feeding tests, is that the best ensilage is produced from corn that has been drilled and not broadcasted. Every stalk of corn should be grown so that it has plenty of soil room in which to develop its roots, plenty of rich soil to draw nourishment from, plenty of air-breathing space, and plenty of sunlight falling directly upon all of its leaves. The immaturity of closely growing corn depends principally upon its lack of sunlight.

Prof. Roberts (*Cornell Experimental Station, New York*, 1888) valued as follows :—

One acre of hay, 1.5 tons	$18 00
" broadcasted corn	19 72
" drilled corn	35 74

"Special attention is called to the fact that heretofore it has been a common practice to sow or plant corn for fodder and ensilaging entirely too thick. Starch and sugar are not fully developed without an abundance of sunlight."—*Cornell*, 1890.)

Wisconsin is the banner state for corn and ensilage. Its report is as follows: "After urging that no variety be used that will not mature in ample time to be gathered into the silo before there is danger of frost, another precaution is that the corn be planted so thin that considerable grain will mature. The ordinary varieties of field corn, either dent or flint, will prove satisfactory for ensilage."

"To obtain mature corn, there must be more room for each plant, so thinner seeding is now practiced."—(*Michigan*, 1889.)

Maryland Experiment Station reported in 1888 as follows in reference to fodder corn (p. 68):

	Height.	Date cut.	Yield, lb.
Drills, 3 ft. apart	9 feet.	Sept. 22	19,540
" 18 in. "	7 "	" 25	15,584
" 9 in. "	5¾ "	" 26	12,700
Broadcast	5 "	" 27	11,464

The height of corn, date of cutting (maturity condition) and yield are all in favor of the drilled corn in this case.

"Thick seeding appears to cause a decrease in the relative amount of nitrogen in the albuminoid form. This diminishes the value of the fodder, as the amide nitrogen is considered to have a less nutritive value. The product of an acre of corn as ordinarily grown has usually a food value little more than half as great as the product of the same in drills as above advised."—(*Maryland*, 1888, *Hy. E. Alvord.*)

"In the culture of ensilage corn the main object is to produce a large yield, and the best way to secure such a result is the important question. The most successful way to reach this end is to plant in drills, and I would recommend that the rows should be three feet apart, with the grains about four inches apart in the row.

"Experience indicates that it is best that the corn should be almost out of the milk state, or just beginning to glaze."—(*Ohio, June*, 1889.)

When to Cut for Silo.

At this point especially chemical analysis of the corn product is of exceedingly great value, as the total weight alone of any green crop is not a safe test of its true feeding value. The latter depends upon the amount and digestibility of the dry constituents, such as protein, fat, sugar, starch, etc. So long as a plant is increasing in size, lengthening its stalks, leaves and roots, growing taller, not much protein, fat, sugar and starch will be deposited or accumulated as a surplus. Analysis has shown that the later stages of development of the corn plant add an enormous amount of the most valuable feeding constituents to the plant, and that cutting the plant too young means a great loss to the ensilage produced from it, whereas allowing it to mature more fully diminishes the percentage of water and greatly increases the weight of valuable food per acre.

"Repeated experiments have shown that to obtain the maximum amount of nutritive matter the corn must be allowed to reach a certain degree of maturity. The proper condition is apparently obtained when the corn has just passed the glazing stage in the flint, and is well dented in the dent corns. Experience and analysis indicate that corn cut at this stage is in the best possible condition for the silo.—(*Wisconsin*, '89.)

"For some years corn was put into the silo when very green. We now know that to make ensilage of greatest value the corn should be more mature. The practice among those the most successful with the silo is to cut when the grain is beginning to glaze."—(*Michigan*, '89.)

"To get the most food value on an acre of corn it should not be cut till the plants begin to show signs of drying and withering and the seeds begin to glaze."—*Maryland*, 1888, *Hy. E. Alvord.*)

Date of Cutting.	Yield per acre.	Dry matter.	Protein.	Fat.	Carbohydrates.	Value.
	lb.	lb.	lb.	lb.	lb.	$
July 24	18,762	2,000	250.6	42	1,543.6	14 05
August 8	24,578	4,039	368.4	81.99	3,328.9	26 16
September 3	27,674	7,214.2	585.8	199.1	6,166.7	47 33

"From the above facts it will be seen that the real feeding value of the corn increased 166 per cent. after it had tasseled out, and 80 per cent. after it had nearly reached the roasting ear stage. This being so, the greatest care should be taken to select those varieties of corn intended for ensilage that will fully mature before frost in the localities where it is proposed to grow them, a less number of tons of mature corn being in all cases more valuable than a much larger number of tons of immature corn."—(*Cornell*, 88.) In March, 1890, Profs. Roberts and Wing, of Cornell, issued a bulletin on corn and ensilage. Basing their conclusions on their own work of 1889, the work of New Hampshire, Pennsylvania and the Geneva Station, New York, they state: "It would seem as though the proper time to cut corn for ensilage was definitely settled by these experiments. An increase of more than two hundred per cent. between the periods of bloom and ripening cannot be ignored, even though the proportion of the more valuable albuminoids is somewhat lessened. What gives the matter additional strength is that these experiments, including all the work so far done in this direction that has come to our notice, are unanimous in their conclusions."

"Bulletin 9, 1889, Missouri Experimental Station, discusses the life history of corn, and contains this among many important statements: "The considerable increase between September 10 and September 17 (amounting to 24 per cent. of the total weight) indicates clearly that a crop of corn should remain in the field as long as possible, the weather permitting, to reach its greatest perfection."

The Massachussetts report for 1885 says (p. 53): "One ton of green fodder corn in tassel contained in one case 397.2 lb. of dry vegetable matter; whilst in the case of the seed just beginning to glaze, 463.8 lb. of dry vegetable matter are found in one ton, a difference of 156.6 lb. in favour of the more matured state of the growth." And the report for 1886 says: "The ensilage of a more matured fodder corn has a higher feeding value pound per pound, compared with that cut at an earlier stage of growth."

It may be interesting to know what the great increase in dry matter consists of that takes place in the later development of the plant. Let me refer again to the Massachusetts report for 1885 (p. 53), cited above, to show the composition of dry matter in fodder corn:—

——	July 22.	July 29.	August 5.	August 13.	August 27.	September 3.
Ash	8.54	8.00	5.95	5.69	4 70	4.22
Cellulose	26.01	27.28	26.40	24.11	24.30	20.93
Fat	3.24	2.65	2.26	2.13	1.81	2.63
Protein	17.19	14.42	11.86	11.23	8.87	9.17
Carbohydrates	45.02	47.64	53.53	56.84	60 32	63.05

Thus we see that the increase is principally in the form of soluble carbohydrates (starch and sugar), which are formed from the air and do not deplete the soil. This table, it must be carefully noted, gives merely the percentage composition, not the total quantity per acre.

Next let us refer to an investigation made by Mr. E. F. Ladd, at the New York Agricultural Experimental Station, Geneva, (1889), Report pp. 88, *et seq.* The figures are in pounds per acre.

Per acre.	Tasseled July 30.	Silked Aug. 9.	In milk Aug. 21.	Glazed Sept. 7.	Ripe Sept. 23.
Total yield	18,045	25,745	32,600	32,295	28,460
Water	14,426	22,666	27,957	25,093	20,542
Dry matter	1,619	3,078	4,643	7,202	7,918
Ash	138.91	201.30	232.15	302.48	364.23
Protein	239.77	426.76	478.69	643.86	677.78
Crude fibre	514.19	872.93	1,561.97	1,755.85	1,734.04
Carbohydrates	653 91	1,399.26	2,441.29	4,239.82	4,827.60
Fat	72.20	167.75	258.90	259.99	314.34

"From the date of full tasseling until ripe the dry matter increased 4.8 times, from 1,619 pounds to 7,918 pounds per acre. From full silking until ripe the increase in dry matter was 2.5 times."

On page 90 the conclusions of two years' investigations are thus stated by Mr. Ladd: 1. That the greatest weight of green fodder is between the period of full silking and the milk stage of kernel. 2. That the total weight diminished after this date, but the total dry matter increased. 3. That as the corn approaches maturity the per cent. of amide nitrogen diminishes, while the albuminoid nitrogen increases, thus seemingly increasing the feeding value of the crop. 4. That the sugars and starch increase rapidly during the later period of growth and maturing of the corn plant, and that these are the most valuable portion of the nitrogen free extract (soluble carbohydrates). 5. That between the period of glazing and full ripening of corn there was a large increase in amount of sugar and starch. 6. That for the greatest nutriment, considered from a chemical standpoint, corn should not be cut before it has well ripened. 7. That the B. and W. corn cannot in ordinary culture be matured in this latitude.

"The general conclusion to be drawn from our experiments, then, as to the proper time of harvesting corn, is that it should be allowed to stand as long as the climate of the locality and the purpose in view will permit, since it is continually increasing in value per acre.—(*Pennsylvania*, '88.)

A bulletin was published in April 1890 by Wm. H. Caldwell, of the Pennsylvania Agricultural Experimental Station on "Indian Corn as a grain and forage crop." He states: "The results of work done at several of the agricultural experiment stations last season show that a great deal of the dry matter (food material) of the corn crop is lost by cutting the crop before it reaches maturity. Last season's work showed such a large increase of dry matter from the time the kernels began to glaze, until matured and field-cured (being more than previous to that time) that it was deemed advisable to determine the increase only between these last two stages of growth this season."

YIELD PER ACRE—DRY MATTER.

	When kernels began to glaze.	In field-cured material.	Gain by allowing crop to mature.
Average of Flints, 1889	3,404	4,785	1,385
Average of Dents, 1889	7,078	8,318	1,240
Average of Dents, 1888	5,259	7,159	1,900

"The results show that fully 20 per cent. of dry matter is gained by allowing the crop to mature."—*Pennsylvania, 1890.*

	July 26.		August 5.		August 19.		September 16.	
	Water.	Dry material	Water.	Dry.	Water.	Dry.	Water.	Dry.
Southern	91.25	8.75	89.18	10.82	84.95	15.05	75.40	24.60
Northern Field Corn	87.75	12.25	86.10	13.90	81.45	18.55	72.40	27.60
Sanford	90.85	9.15	86.79	13.21	86.75	13.25	77.20	22.80
Pride of the North	90.65	9.35	87.56	12.44	82.25	17.75		29.05

PERCENTAGE INCREASE OF DRY SUBSTANCE.

——	July 26 to Sept. 16.	August 9 to Sept. 16.
Southern	181 per cent.	63.4 per cent.
Northern Field Corn	125 "	48.8
Sanford	149 "	72
Pride of the North	216 "	66.4 "
	671	250.6
Average	167.75 per cent.	62.6 per cent.

i.e. 167¾ per cent. is the average increase from July 26 to September 16—(52 days.)
62.6 " " " August 19 to September 16—(28 days.)

From August 19 to September 16, the increase in dry matter is 37.3 per cent. of the total increase from July 26 to September 16.—(*New Hampshire, 1888, G. H. Whitcher.*)

CHANGES AND LOSSES IN SILO.

There is always a loss in the material put into the silo during the continuance of the process; it will vary from a very small amount to one-half of the total dry matter. The loss is due principally to the productions of acids by fermentations; some of these acids and the other compounds produced at the same time escape and are a total loss; even if retained the acids, of course, are not so valuable as foods as the substance out of which they have been formed. The sourness or acidity of a sample of ensilage is therefore an indication of the destruction of valuable plant material, and the production of as sweet a sample as possible is recommended for many obvious reasons. The acid will vary from .02 per cent. to over 2 per cent. When there is little acid the ensilage is called sweet; when there is much acid, it is called sour. The changes taking place in fermentation affect the constituents of the plants in the following order: sugar, starch, fibre, nitrogenous compounds. It becomes therefore a very important question to know how the fermentation and the consequent loss of from 5 to 30 per cent. may be checked.

Water—The presence of a large quantity of water in the corn certainly increases its tendency to fermentation. We know that matured grains, straws, well-cured hay, succulent food thoroughly dried, manure deprived of its moisture will not ferment. By putting in the corn then with not too much water we shall prevent souring. As corn matures its percentage of water gradually diminishes; this has been proven in our experiments here and at many other stations. The following table shows the percentage of water in fodder corn at different stages as given in the Massachusetts report, 1885:

——	July 22.	July 29.	August 5.	August 13.	August 27.	Sept. 3.
Water	88.61	85.76	84.64	82.08	81.15	75.81
Solids	11.30	14.24	15.36	17.92	18.85	23.19

"The change from sour to sweet ensilage has accompanied a greater maturity of the corn; each year the corn has been planted a little thinner and allowed to become more

mature before being put in the silo, and each year has seen a less degree of acidity in the ensilage. Examination of the analysis of ensilage received from various silos in the state, as well as our own, would seem to indicate that the acidity varies with the amount of water present in the corn; the more water the greater the per cent. of acid."—*Winsconsin, 1889.*

Condition at Maturity—"The marked increase of nitrogen free extract (members of the starch family) as the corn matures and the progressive decrease of acid in the ensilage show how greatly the corn improves as it approaches ripening. The relatively large amount of water and crude fibre in the young plant justifies the epithets 'slush' and 'swill' as applied to the ensilage from such material."—(*Michigan Experimental Station Report, 1889*). This statement accompanies a table of analysis of ensilage from which the following is taken:

No. 1,	August	25,	wilted two days, then ensiled,	1.10 per cent. acid.
" 2,	"	27,	put in fresh.....	1.02 "
" 3,	September	1,	wilted two days.	0.95 "
" 4,	"	3,	put in fresh.	0.91 "
" 5,	"	8,	wilted two days.....	0.87 "
" 6,	"	10,	put in fresh.....	0.80 "
" 7,	"	13,	put in fresh.....	0.81 "
	September	14,	killing frost.	

The more matured a plant, the more fixed, less changeable are its constituents, *i.e.* the constituents of a young plant will suffer change or decomposition more rapidly than those of the same plant more matured.

Temperature—Mr. George Fry of England, in his work "Sweet Ensilage," laid great stress on the necessity of raising the ensilage to 122° F., thereby to stop the various ferments. The most favorable temperature for the development and working of the various ferments is about 95° F., and most of them cease at 122° F., but some continue active to 140° F. Fry says that excess of water in succulent food prevents this rise of temperature and that sour ensilage thereby results, as the ferments are not then destroyed.

In opposition to Fry, Prof. Alvord, of Maryland Experimental Station, says: "Temperatures 110° to 140° F. are most favorable for their development and activity, and it requires at least 185° F. to destroy them, while fermenting, ensilage does not often exceed 140° F., and no authentic record of 150° F. can be found."

Along the same line Prof. Johnson, of Michigan, says: "I am of opinion, however, that positive evidence to sustain this theory is almost, if not entirely, wanting. Enough careful work has not been done to demonstrate it beyond question."

Upon the subject of ensilage, Dr. Burrill, of Illinois, makes the following remarks in a bulletin published November, 1889.

"It is plain that a body cannot be raised to a higher temperature through the process of fermentation than the organism causing such fermentation is capable of enduring. There seems, indeed, to be no reason for supposing that the heat should be greater than that under which the organism finds its best development, because above this point the action is retarded; hence less heat is produced. When slow filling and consequent high temperature is relied upon, the resulting product is in a widely different state as to fermentive changes from that so-called sweet ensilage obtained without heat. There is much less loss through fermentation in the latter case. The best results are obtained by the most nearly perfect exclusion of the air. For this purpose, uniform distribution upon filling the silo is of more importance than persistent trampling, because the pressure of the mass must be mostly relied upon."

All things considered the main points undoubtedly are (1) to have the corn well matured, (2) to house it and fill it uniformly, so as to exclude air, (3) to keep it as free from air as possible; with these well observed, a fair sample of sweet ensilage may always be expected.

Effect on the nitrogenous compounds.—During the changes taking place in the silo a decided and important change is effected upon the protein or muscle-forming portion of the food; some of it is changed from the protein to the non-protein form, from a condition capable of producing flesh and muscle to a condition incapable of this.

Michigan Experimental Station, Bulletin 49, May, 1889, states: "A small loss of crude protein is common in the silo, but the change from albuminoid to amide condition of the nitrogen compounds is the most striking feature of ensiling. These two facts point to a loss of value in ensilage as compared with the fresh corn stalks, or even the dry material, when it has been rapidly and perfectly cured."

The same conclusion was arrived at by Dr. Voelcker in 1886-87, and reported upon to the Royal Agricultural Society, of England, Report XLVI., p. 403. Silage was made from grass, and compared with hay from the same. "The total loss due to fermentation, evaporation, etc., in making the silage was 7.29 per cent. on fresh grass; of this 3.25 per cent. consisted of water. The loss of total nitrogen when, as here, no drainage is allowed to flow away, is very slight; but the nitrogenous bodies have undergone considerable change from the albuminoid to the non-albuminoid condition. The woody fibre, as indeed the whole of the fibre, has been diminished; insoluble albuminoids are lessened, and the soluble albuminoids increased. In the hay the nitrogen has undergone but little change."

Lawes and Gilbert, of England, report as follows, 1884-85: "Not only is there a loss of nitrogenous food material, but a very considerable proportion of the nitrogenous substance which remains is degraded into compounds, some of which are of no value as food (ammonia for example), whilst others, forming a much larger proportion, are, to say the least, of reduced food value. Further, besides the loss and the degradation of nitrogenous substance, it has been shown that there was also more or less loss of non-nitrogenous matter; whilst there is no evidence that woody fibre of a certain degree of induration has been rendered more soluble." (*Experiments on Ensilage, p. 23*)

Effect on Nitrogen.—"The analyses show a decrease in the total nitrogen of 0.29 per cent., or a loss of 14.6 per cent. of the total nitrogen in the fodder. There was a decrease of 2.58 per cent. of albumincids in the total solids, equivalent to a loss of 24.5 per cent. of the total albuminoids put in the silo. It will be understood that the albumincids are indispensable nutrients of any food ration, and are not replaceable by any other class of nutrients. The loss is in part due to their reduction into amides and other degraded nitrogenous compounds. Thus, while there was only 0.3 per cent. of non-albuminoid nitrogen in the corn fodder, there was 0.4 per cent. in the ensilage. Of the total nitrogen in the corn fodder, only 15.15 per cent. was in the form of non-albuminoid nitrogen, while in the ensilage there was 25.44 per cent. These degraded forms are supposed to have about the same feeding value as the soluble carbohydrates." (*Illinois, Aug., 1888, Thos. J. Hunt*).

"The amides of sweet and field corn ensilage increased in silo from 8.69 per cent. to 18.94 per cent., a distinctive loss." (*Missouri, Prof. Sanborn*)

Ensilage as a Food.

Water.—The water varies from 64.4 to 87.0 per cent. From our investigations it appears that the best, the sweetest, and the greatest amount of ensilage will be produced when the amount of water lies near 75 per cent., between that and 80 per cent.

Crude Protein.—In food analyses, this of course includes the less valuable amides, which are not flesh and muscle formers but heat producers. The following table gives a few analyses separating the true protein from the amides or non-protein. I have said

before that in the silo true protein will be changed to amides to a certain extent ; this in addition to the amides always existing in young growing plants, will give us a high per cent. of non-protein :

—	Total crude protein.	True protein.	Amides or non-protein.	Per cent. of true protein.	Per cent. of non-protein.
New York, 1886	0.85	0.50	0.35	58.83	41.17
" "	0.85	0.45	0.40	52.95	47.05
" "	1.08	0.75	0.33	69.45	30.55
" "	1.17	0.73	0.44	62.40	37.60
Wisconsin, 1888	1.92	0.99	0.93	51.58	48.42
Dr. Voelcker, 1884	1.12	0.68	0.44	61.10	38.90
Pennsylvania, 1889	2.15	.3	0.72	66.52	33.48
" "	2.35	.75	0.60	74.47	25.53
" "	2.43	0.98	0.45	81.48	18.52
" "	2.34	1.0	0.74	68 42	31.58
Michigan, 11 analyses, 1889	1.32	.....	0.50	62.12	37.88
Average	.....	.....	.....	63.36	36.64

German investigators have found non-protein in considerable quantities in roots, potatoes, malt sprouts and fodder plants of all kinds, the average in the last case being about 30 per cent, In four analyses of malt sprouts Kellner found an average of 27.40 per cent. (Armsby). The average so far found in corn ensilage is in excess of that usually found in the freshly gathered plants, and this large quantity of non-protein to a certain extent takes from the value of the ensilage and demands a liberal addition of nitrogenous foods to it to make complete rations.

Fat.—There is little or no true fat in corn ensilage, unless it be made from corn well matured. The fat represented in our tables is ether-extract more properly, and consists largely of chlorophyll, waxy matters and acids. The amount of fat, therefore, may be considered as of little or no value.

—	Water.	Protein.	Fat.	Soluble carbohydrates	Fibre.	Ash.	Nutritive ratio.
Colostrum	71.7	20.7	3.4	2.5	.....	1.8	1: 0.5
Whole milk	87.0	4.0	3.7	4.6	.....	0.7	1: 3.3
Grass	75 0	3.0	0.8	13.1	6.0	2.1	1: 7.0
Corn ensilage	79.8	1 6	0.7	10 6	6.0	1.3	1:11.0

Nature's feeding is from colostrum, to whole milk, to green grass. By consulting our table we see that corn ensilage is alone not sufficient to take the place of either whole

milk or good pasture grass, that the great lack is in nitrogenous constituents, flesh and muscle formers, and that the use of ensilage in a ration demands the addition of foods containing protein and fat, such as good hay, grains, bran, cake, in such proportions as must be regulated by the circumstances of the feeder and market prices.

In the early history of ensilage it was usually considered a complete ration; experience, however, does not seem to justify this conclusion, but better results follow the use of some more nitrogenous food in connection with the ensilage, such as oil meal, wheat bran, clover hay, or other nitrogenous foods." (*Ohio, June, 1889*).

Corn Silage *vs* Field Beets as Food for Cows.

1. "The dry matter of corn silage and of field beets is at least equal in value to the dry matter of the better grades of stock feed in ordinary use, when fed in properly adjusted rations.

2. Corn silage is slightly superior to field beets as a flesh or fat producer, and beets are slightly better than corn silage for milk production." (*Ohio, June, 1889, Hickman.*)

"The large accumulation of the data of Europe and America in my possession fail to show that a ton of dry matter taken out of a silo is superior to a ton of dry matter drystored." (*Missouri, Prof. Sanborn*).

"The silo goes with high pressure farming; those who are satisfied to carry more cattle than can consume the straw and corn-stalks usually produced on the farm have little need of a change. The farmer who needs the silo is one who is carrying a large number of cattle upon a given area and needs more 'roughage' for them. Before adopting the silo many should change their system of farming." (*Prof. Henry, Wisconsin, 1889*).

Conclusions.

1. Poor corn will make poorer ensilage.
2. The best ensilage can be made only from the best corn.
3. Choose early maturing varieties.
4. Sow in drills so as to allow to mature.
5. Cut when well on to maturing.
6. Put in a proper silo.
7. Feed in moderate quantities.
8. Supplement by foods rich in fat and nitrogen.
9. Ensilage will not pay unless well made.
10. Do not expect too much from its use.

REPORT ON FISH AND FISH REFUSE FROM BRITISH COLUMBIA, RECEIVED MARCH, 1890.

SAMPLE I.—Head and entrails of large fish, (salmon).
SAMPLE II.— " " " "
SAMPLE III.—Finely divided refuse from canning factory.
SAMPLE IV.—Herrings whole.

Taken from the cans as received these consisted of the following amounts of water and dry substance :—

——	I.	II.	III.	IV.
	Percentage.	Percentage.	Percentage.	Percentage.
Water	70.41	77.17	77.04	77.50
Dry matter	29.89	22.83	22.96	22.50

By drying as thoroughly as possible the amount of water was reduced to about five per cent. so that in drying the original material was reduced to nearly one-fourth of its original weight.

The dried material gave the following by analysis :—

——	I.	II.	III.	IV.
	Percentage.	Percentage.	Percentage.	Percentage.
Water	5.91	5.76	2.08	7.48
Ash	17.62	18.48	13.54	10.15
Organic matter	76.47	75.76	84.38	82.37
Oil or fat	27.21	25.55	66.95	18.29
Nitrogen	6.32	7.80	5.55	7.96
Phosphoric acid	5.70	6.67	4.79	2.72
Potash	0.36	0.51	0.58	0.21

If the materials were deprived of their oil or fat and manufactured into a dried we powdered fertilizer without the admixture of anything foreign or additional, it wou

have about the following composition, as far as its most valuable fertilizing constituents are concerned.

——	I.	II.	III.	IV.
	Percentage.	Percentage.	Percentage.	Percentage.
Water	10.00	10.00	8.00	10.00
Nitrogen	8.50	10.00	12.00	9.50
Phosphoric acid	7.50	8.50	11.00	3.50
Potash	0.50	0.50	1.00	0.30

"An analysis by Arendt of Norwegian fish-scrap gave of:

Moisture	17 per cent.
Nitrogen	10½ "
Phosphoric acid	4 "
Organic matter	72 "
Ashes	12 "

other samples have shown more phosphoric acid (13 to 15 per cent.) and less nitrogen (8½ to 9 per cent). Some of them were of scrap than had been steamed to remove the oil." (*Prof. T. H. Storer*).

It will thus be seen that a most excellent fertilizer can be produced from any one or all of the samples of fish refuse sent here for analysis by (*a*) extracting the fat or oil, (*b*) removing the excess of moisture by drying, (*c*) thoroughly pulverizing. The fertilizer thus produced would be rich in nitrogen and phosphoric acid, but would be deficient in potash, to make a *complete* fertilizer of it an addition of sulphate of potash might be made. Norwegian fish potash guano thus produced contains as follows according to Dr. Griffiths ("Artificial Manures.")

——	Cod and potash.	Herring and potash.
	Percentage.	Percentage.
Nitrogen equal to ammonia	7.00	7.05
Phosphates, (fish bone)	20.00	8.00
Potash, (sulphate)	15.00	15.00
Magnesia	10.00	10.00
Sandy matter	1.00	1.00
Water	5.00	5.00

"These fish guanos are shipped from Jensen's works in the Lofoden Islands (Norway) and conveyed to England," according to the same authority English fish guanos

(without potash) sell from £5 10s. to £6 per ton. American fish and potash sells at from $25 to $35 per ton. Potash and phosphates are added to the fish refuse and they contain from 2½ to 4½ per cent. of nitrogen from 3 to 13 per cent. of phosphoric acid, and from 3 to 6 per cent. of potash.

Norwegian Fish Guano.—In the report of the transactions of the Highland and Agricultural Society of Scotland for 1886, Mr. William Watt, of Aberdeen, thus describes (p. 201) the Norwegian method of treating the cod refuse. "The raw material principally used at the Norwegian manufactories are the heads and bones of cod, with the tissue of livers from which the oil has been extracted; but use is made also of the softer parts of the fish, the heads and viscera of herring, the flesh of whales and sharks and all kinds of damaged or otherwise useless fish, whether dried or fresh. First quality guano is produced from the bones and head of cod, in the proportion of one of the former to five of the latter, and the manner of manipulation may be thus described:—The raw materials are spread out to dry in the sun, the heads being first strung together for convenience in handling. They then go to the factory and are there first chopped small by a mincing machine, and next passed on to a kiln where the remaining water is sent off in vapour. Up to this point the bones and heads are treated separately, but now they are mixed together in their due proportions and ground between large millstones, the result being a 'grey guano' ready for sale. When salty or oily materials are used the mass, after being chopped, but before reaching the kiln, is first exposed for a time to steam pressure in a suitably constructed iron cylinder. In lieu of this mode of extraction the materials may be put into a jacketed pan and exposed for a time to steam heat, with constant stirring and the removal of the oil set free, the elimination being completed by hydraulic pressure. Without the complete extraction of oil and salt and effective drying, a finely pulverised guano cannot be obtained."

Prof. Storer, of the Agricultural Department of Harvard, in his "Agriculture in some of its relations to Chemistry" thus describes the method adopted in the Eastern States: "The American fish guano is a product obtained incidentally in the manufacture of oil from a coarse sort of herring called the menhaden or pogy In order to get their oil the pogies are boiled in water to a sort of porridge or thick soup, which is pressed in a mill, just as ground apples are pressed in the manufacture of cider. The oil that was contained in the flesh of the fish collects upon the surface of the expressed liquid, while the half-dry pomace or residue left in the mill is the fish scrap. Sometimes this product is pressed into barrels at once for transportation, though more commonly perhaps it is left in loose heaps to heat and dry out to a certain extent. Occasionally the pomace is spread out upon platforms to dry pretty thoroughly and is afterward ground in a mill."

Uses of the oil thus obtained.—I am not in a position to say from the samples, as they were very offensive and the quantity of oil obtained very small to what uses the oil could be put—the probability is that it could be easily disposed of for manufacturing purposes. Mr. Watt on p. 203 of the article above referred to says: "The oil from the herring is serviceable for a great many industrial purposes—for the preparation of leather, in the treatment of vegetable fibres prior to spinning, in the manufacture of soap (which is the great use to which the analogous menhaden oil is turned in America), and for lubrication and burning."

Commercial Value of the Material.—From one ton of undried refuse and herrings there should be obtained at least 100 lb. of oil, and perhaps much more, and from 400 to 500 lb. of fish guano or fertilizer, the latter worth between $20 and $30 a ton, or the ton of raw fresh material should produce oil and fertilizer worth at least $15 and perhaps $20. On this question of value production Mr. Watt speaks as follows: "From ten tons of average herrings in the fishing season there would be obtained 1½ ton of oil perhaps and two tons of fish guano. If say 300 gallons of oil were obtained, which is a moderate estimate, and the price to be 2s. a gallon, which might probably be realised, the oil of ten tons of fish would produce £30. Then there would be 2 tons of guano at £10 per ton. Thus if these estimates are at all trustworthy something like £5 a ton

might be realised through the manipulation of herrings as a raw material of oil and manure." The above value of £5 per ton is, perhaps, too high for this country, but, making allowance for that, our valuation of $15 to $20 per ton will not be much astray.

Conclusion.—From the consideration of the whole question, I am of the opinion that the manufacture of the refuse into fertilizer is strongly to be recommended because :

1st. It will thus utilize a bye-product that otherwise is a total loss.

2nd. It will prevent the waters from becoming contaminated.

3rd. Its proper management must tend towards a more healthful surrounding.

4th. Its return to the soils of the farm will partly offset the waste of our cities by sewage carried to the lakes and rivers.

5th. If properly handled *it will pay well.*

From the great importance of this question to the health of the community, the welfare of the fishing industry and the progress of agriculture, I have endeavored to reply at this length.

ANALYSIS OF BEETS GROWN AT THE ONTARIO EXPERIMENTAL FARM, GUELPH, 1890.

TABLE I.

Analysis by C. C. James.

Lot.	No. of Beets.	Net Weight.	Analysis of Juice.			
			Brix.	Sugar.	Purity.	
		lbs. oz.				
1	4	4 8	17.05	15.00	85.07	Fair shape, average, one above ground.
2	4	3 4	20.05	17.05	85.03	Fair shape, smaller.
3	5	3 13	21.00	16.00	76.02	
4	4	4 8	16.03	14.05	88.09	Exceptionally good.
5	4	4 4	17.03	14.08	85.05	Good shape.
6	5	4 4	16.03	14.00	86.00	Good shape.
7	1	3 3	14.00	10.00	71.04	Large, misshapen, above ground.
.....	27	27 12	.....	.....	.....	
Average 1890		1 0½	18.03	15.08	83.64	
Average 1889		2 1½	21.50	18.00	83.70	

TABLE II.

Analysis by W. Skaife.

	Weight.	Analysis of Juice.		
		Solids.	Sugar.	Purity.
	lbs. oz.			
26 beets divided into 5 lots, taken from carts as they arrived from the field.....	.....	18.00	14.06	81.11
	.....	19.00	15.03	80.53
	.....	17.05	14.05	82.85
	.....	18.00	15.00	83.33
	28 12	18.00	14.08	82.22
Average of 26 beets.....	1 $1\frac{3}{8}$	18.01	14.84	82.00
Extra large beets, outside row, 3 beets.....	10 8	13.05	9.05	70.04
5 beets.....	7 11	16.05	12.05	75.08
Average of 8 beets.....	2 $4\frac{3}{8}$	15.04	11.04	74.03

Our beets for 1890 were, therefore, smaller than those of 1889, lower in sugar, but of the same degree of purity.

Sugar Beets.

In the following pages are given the results in detail of the chemical investigations of the sugar beets grown experimentally during 1890 in the Province of Ontario. By reference to our report for 1889, it will be seen that during the preceding year a similar experiment upon a smaller scale was carried out and the results published. The seed for both of these series of experiments was furnished by Mr. Wilfrid Skaife, B.A. Sc., sugar expert and manufacturer, of Montreal, Que., it having been imported from the establishment of Herrn Karl Krueger, Muecheln, Germany. As indicated in the following tables, these beets were grown in various parts of the province, whence fair samples were taken and shipped to this laboratory by Mr. Robt. H. Lawder, who was specially deputed for that purpose. Here they were analyzed by Mr. Skaife and myself. In some cases the tables contain the results of work done separately, in other cases, as stated, the results represent our combined work. In every case the utmost effort has been made to obtain accurate average results of the beets produced ; in a few cases where the beets were a long time on the journey, a little wilting has evidently produced a slight effect.

In all cases the analyses state :

Solids = total solids found in the juice expressed.
Sugar = sugar " " " "
Purity = $\frac{\text{sugar}}{\text{solids}}$ " " " "

In determining the amount of sugar in the beets it is usual to take 95% of the amount of sugar found in the juice. We have left all our calculations, however, as sugar in juice or polariscope reading.

For further information as to amount of produce and cost see Prof. Shaw's report on sugar beets found in this same volume (1890 Ontario Experimental Farm report). These results we have given in detail, and by themselves, as one acre of roots were grown at the farm here. The only other experiment reported upon in this series of equal extent is that of Mr. T. B. Carlaw, of Warkworth, who also grew one acre. For this report see under Cobourg District, in following tables.

Next I shall give our summary of results by districts, and average for the whole province, reserving the detailed analysis for the end.

In this table the number in each case is the number of samples analysed :

District.	No.	Solids.	Sugar.	Purity.
Guelph	28	17.21	13.52	78.56
Whitby	32	17.40	13.35	78.54
Cobourg	11	17.07	14.28	79.23
Bay of Quinte	8	16.93	13.35	78.43
Oakville	11	16.09	13.37	78.41
Esseex	8	16.74	13.41	78.63
Various	19	17.37	13.92	80.10

General Summary for the Province.

Total number of beets analysed 419
" weight " " ..... 518 lbs. 2 oz.

	No. of Samples.	Average Weight.	Solids.	Sugar.	Purity.
78 Beets over 2 lbs. each in weight	35	2 14	16.45	12.35	75.1
341 Beets under 2 lbs. each in weight	82	0 14	17.41	14.10	81.02
Average of all	117	1.4	17.12	13.58	79.32

The 1889 samples analysed at the Chemical Laboratory, Guelph, (26 in number), showed an average weight of 2 lb. 2 oz., solids 18.95 per cent., sugar in juice 14.35 per cent., and purity 75.7 per cent., from which it will be seen that the beets of 1890 were smaller, slightly lower in sugar, but higher in purity, and represent a class of beets much

more profitable for sugar making than those of 1889. The difference in value between large and small beets is clearly brought out in the above general summary, the smaller beets being the richer and of higher purity.

The following table, (C. C. James), presents results based upon the cultivation of the beet. So many samples came in having green tops, showing lack of covering or cultivation, that it was thought advisable to present the growers with direct evidence of the great value and necessity of thorough cultivation in the production of beets for sugar making. Beets of various sizes were taken so that we here have a comparison based on size as well as on cultivation.

			No.	lb. oz.	Solids in Juice.	Sugar in Juice.	Purity.
Well cultivated	Small, well grown good shape	tops	4	2 0	20.50	17.00	82.9
		bottoms	4	2 0	21.00	18.00	85.7
	Large, well grown good shape	tops	2	3 8	17.00	14.00	82.4
		bottoms	2	3 8	19.00	15.25	80.3
Poorly cultivated	Large, much above ground	tops	3	4 4	14.25	10.00	70.2
		bottoms	3	5 13½	15.00	12.00	80.0
	Large, much above ground	tops	2	3 12	16.00	12.00	75.0
		bottoms	2	3 12	16.50	13.00	78.8
	Medium, much above ground	tops	2	2 0	18.00	13.00	72 2
		bottoms	2	2 6	20.00	16.00	80.0
	Medium, much above ground	tops	2	2 6	13.50	6.75	50.0
		bottoms	2	2 11	16.50	10.75	65.0
	Medium, much above ground	tops	5	4 10	18.00	12.75	70.8
		bottoms	5	4 13	18.50	15.50	83.8
	Medium, much above ground	tops	5	3 11	18.00	14.00	77.7
		bottoms	5	5 0	19.00	14.50	76.3

In each case the tops and bottoms are of the same beets. In the well grown beets the roots were equally divided by weight, in the poorly grown they were divided by the ground line on the roots. The second sample proved to be remarkable beets, they came from the Bay of Quinte district. In every case more sugar is found in the bottoms and as shown in the following summary the higher purity belongs to the well grown samples.

		Solids.	Sugar.	Purity.
Well grown, average of	tops	18.75	15.5	82.7
	bottoms	20.00	16.6	83.0
Poorly grown, average of	tops	16.3	11.4	69.9
	bottoms	17.6	13.6	77.2

The analyses contained in the preceding tables confirm what has elsewhere been universally observed, viz., that there is a very great difference between the out-of-ground portion, of a poorly grown beet and the under-ground portion; that not

only is there less sugar but the purity is much less, and that to produce sugar beets of the best quality they must be kept well covered. In this respect many of the samples grown in Ontario are faulty, whereas even in the case of larger beets which have been carefully covered the percentage of sugar and purity have both been high.

Conclusions by C. C. James.

Yield.—As to this we have but little reliable information, calculations from a row or two not being always trustworthy. The calculation of Mr. T. B. Carlaw, of Percy, Northumberland county, is interesting, as he grew an acre of beets, the product being estimated at 26.7 tons.

Shape and Size.—Great irregularity was manifest in most of the samples; in many cases, however, the ideal of the French and German was attained. Our results certainly lead to the conclusion that the tapering, well shaped beet weighing from $\frac{3}{4}$ to $1\frac{3}{4}$ lb. is the very best sugar producing beet if kept well covered. Green tops, showing lack of cultivation, were very common, and the analyses of the tops and bottoms prove conclusively that the amount of sugar, but especially the degree of purity, has been greatly lowered thereby.

Sugar.—Our average is nearly 14 per cent., much exceeded in some well-grown beets, and not attained by over-grown and poorly cared for samples. Some analyses available, taken from Washington report for 1890, may prove interesting for comparison, as the following:

Locality.	Sugar in Juice.	Purity.
Ontario	13.58	79.32
California	14.38	83.70
Kansas	10.85	72.64
Nebraska	12.55	58.30
Wisconsin	14.31	
Michigan	12.04	
Indiana	11.76	
France (large)	10.91 to 12.24	
France (small)	15.50 to 18.60	

Purity.—This is an improvement upon 1889 beets, but can still be further increased by attention to size and cultivation. The larger the beet the lower the purity, and the more out of ground the lower the purity.

General Conclusions by W. Skaife

The analyses are valuable evidences of the fact that sugar beets of fine quality may be grown in many parts of Ontario with proper care. Wherever the roots were well cultivated, both as regards keeping them below the ground and keeping the soil loose, the result was satisfactory. There are some instances also of roots sown in stony or very

lumpy ground turning out well because of their being kept well below the surface. There are further instances of roots which have been well cared for, but have not succeeded owing to unsuitable soil or climate. But on the whole it may be said that the analyses would have averaged at least 14.5 per cent. sugar had the printed instructions been carefully followed, and much higher had the roots been grown in larger areas so as to have the benefit to be derived from close planting. This they lost through being, in the vast majority of instances, planted in but one or two rows. The richest beets received were grown by Mr. R, Willis, of Whitby. The finest and most regular lot, and those which would probably give the highest yield of sugar per acre, were from Mr. Thomas Ballantyne, of Stratford. The most remarkable beet was sent by Mr. Aaron Schantz, of Waterloo, being 4 lb. 8 oz. in weight and analysing 13.2 sugar, with 82.3 purity coefficient. The general appearance of the samples, together with their net weight and analyses, seems to point to the general conclusion that the yield per acre in the Province of Ontario would be higher than in Europe, while the percentage of sugar would be as high under intelligent cultivation.

During our investigation five samples of beets came in that had been grown from seed other than that imported for these experiments. We give an analysis of these in a separate table. The average is below that of our former table both in sugar and purity, though one sample (J. & R. Millar's) turned out very well.

SUGAR BEETS FROM OTHER SEED.

Grower.	Locality.	Seed.	Solids.	Sugar.	Purity.
O. E. Farm	Guelph	Dudgeon's white	16.0	11.5	71.8
"	"	" red.	16.0	12.5	78.1
"	"	Bruce's white	17.5	13.5	77.1
J. & R. Millar	"	Dudgeon's	18.7	15.5	82.3
Wm. Richmond	Dumfries	Red sugar beets	14.5	11.5	79.3
Average			16.54	12.90	77.9

The following extended tables contain the combined results of our work upon the separate samples, so far as we could identify them. One or two samples appear to have gone astray in shipment. We give the name of the grower or sender; the locality usually refers to the township; the nature of the soil is given where we have that information; "M" in fourth column means that the ground was manured for this crop; "A" means grown *much* above ground; "a" means grown slightly above ground; "B" means grown all below ground; "brix" refers to solids in juice.

Guelph District.

Name of Grower.	Locality.	Kind of Soil.	Manured or not.	Date of Sowing, May	Date of Extraction, Oct.	No. of beets analysed.	Net Wt. of samples analysed.	Above or below ground.	Analyses of Juice. Brix.	Sugar.	Purity.	Remarks.
							lb.oz.					
James Laidlaw						4	4.12	B	17.25	15.00	86.8	Very good shape.
McBride Duncan	Guelph					10	6.13	a	17.00	14.00	82.3	Good shape but too small.
Aaron Schantz	Waterloo	Sandy loam				1	4.8	B	16.0	13 2	82.5	Very large, perfectly-shaped root.
"	"	"				5	8.11	B	18.25	15.4	84.3	Very good shape. Regular lot.
B. Schumacher	"	"				2	5.11	A	18.0	12.0	66.6	Large, well-shaped beets.
"	"	"				3	3.7	A	18.75	13.7	73.0	Fair shape.
David Betzner	"	"	M			6	7.7	B	17.75	14.7	82.8	Very fine, regular lot.
"	"	"				1	2.3	B	17.0	14.0	82.3	Very fine beet.
At. Werner	"	"	M			5	6.9	B	17.25	14.0	81.1	Very irregular shape.
"	"	"				1	3.13	B	16.0	12.0	75.0	Large round beet.
Peter Weaver	"	"				3	5.2	B	16.25	12.7	78.1	Very regular lot, but poor shape.
Brubacher and Schmitt	Woolwich	Clay loam	M	1st	21st	4	11.8	A	13.50	10.0	74.7	Large round beets.
"	"	Sandy loam	M	12th	15th	4	6.10	a	17.50	12.5	72.0	Fair shape.
"	"	"				3	4.8	B	17.75	14.2	80.0	"
W. Wenger	Normandy					2	6.9	a	17.0	12.0	70.5	Large well-shaped beets.
A. Hume	"	Sandy loam		18th	20th	2	2.6	a	17.0	14.0	82.3	Fair shape.
Thos. Todd	Galt	Clay loam		10th	23d	4	6.15	a	15.0	12.0	80.0	"
Thos. Ballantyne	Stratford	Clay	M			10	12.2	B	20.0	16.5	82.5	Very regular, perfect lot
Tilman Schantz	Berlin					3	7.6	a	18.25	14.75	80.8	Fair shape.
George Barrie	Dumfries	Clay loam				4	15.12	a	17.0	12.5	73.5	Large beets, poor shape.
"	"	"				4	6.10		16.4	13.0	79.2	Fair shape,
Alex. Scott	"	Light loam	M	1st	25th	4	5.4	B	19.0	16.0	84.2	Very good shape.
Wm. Richmond	"	Rich loam	M	1st	29th	3	5.4	B	18.0	14.5	80.5	Very fine beets.
David Goldie	"	Garden		1st	22d	6	13.0	B	15.5	11.75	76.1	Fair shape but too large.
Erskine Stewart	"	"		3d	22d	3	7.6	B	16.5	13.0	78.7	Fair shape.
James Lilie	Blenheim	Sandy loam	M	3d	22d	10	6.8	a	19.0	15.0	78.9	Good shape but very small.
?	Fergus					1	3.12	A	17.0	11.0	64.8	Very large and poorly grown.
Ont. Exp. Farm	Guelph					27	27.12	B	18.03	15.08	83.64	

Whitby District.

S. McConnachie	Pickering	Clay loam	M	25th.	11th	3	3.14	a	16.5	14.0	84.8	Three fine beets.
"	"					4	2.10	A	16.5	14.0	84.8	Small beets good shape.

G. Long	"	Clay loam	M	15th	11th	5	6.60	B	16.0	13.0	81.2	Good shape, rather rooty.
Hy. Westgate	"	Heavy clay	....	1st	11th	1	3.8	A	16.0	12.0	75.0	Very woody fibre, fair shape.
"	"	"	....	1st	11th	4	6.0	a	16.3	14.0	85.8	" "
S. H. Grierson	Whitby		....	.....	.....	3	3.10	B	19.5	15.8	81.0	Fine looking roots, but rather short.
"	"		....	.....	.....	2	2.8	A	16.5	13.0	78.6	Good shape.
Hon. J. Dryden	"	Black loam	....	1st	12th	4	6.8½	A	16.5	13.5	81.8	Good shape, but irregular in size.
Dr. Lick	"		....	12th	11th	12	12.3	a	15.0	11.0	73.3	Very irregular lot; largest, 2 lb. 9 oz.; smallest, 3 oz.; several hollow.
R. Willis	"	Clay loam	M	.....	.....	4	3.12	B	17.5	15.0	85.7	Good shape, but rather rooty; not ripe.
"			....	.....	.....	4	3.4	B	20.0	17.5	87.5	Very fine beets.
R. Lynde		Clay loam	M	30th	15th	5	8.11	a	16.5	12.0	72.7	Rounded, short beets.
Wm. Jeffrey		"	M	20th	15th	2	4.4	a	18.0	14.5	80.5	Fair shape.
"			....	20th	15th	2	2.4	B	20.0	17.0	85.0	Very fine beets.
David Briggs			....	.....	.....	6	5.6	B	19 25	14.17	76.3	Good shape, but too small.
C. C. Kellet	Port Perry	Sandy loam	M	1st	15th	3	9.6	a	15.25	12.2	80.0	Very large, round beets.
Wm. McGill	"	"	M	15th	13th	3	7.1	a	13.0	9.25	71.1	Badly shaped round beets.
"	"	"	M	15th	13th	4	5.8	a	18.0	13.2	73.2	Good shape.
Wm. Pearson	each	Clay loam	M	30th	11th	2	5.4	a	16.0	12.0	75.0	"
J. M. McClintock	"	Sandy loam	M	15th	11th	3	3.6	a	16.0	12.0	75.0	Very good shape.
J. Whitfield	"	Clay loam	....	1st	11th	6	16.12	B	16.5	12.0	72.7	Fair shape, but rooty.
F. & J. Manderson	"	"	M	30th	11th	10	4.8	a	21.0	13.25	63.0	Very small, unripe beets from 4 oz. upwards
"	"	"	M	30th	11th	2	3.4	B	16.0	11.25	70.3	Good shape, but unripe.
John Heard	"	"	M	15th	14th	3	4.0	a	18.25	14.7	80.5	Good shape.
"	"	"	M	15th	14th	2	3.4	B	18.0	14.7	81.6	"
James Cootes	Cartright	Sandy loam	M	30th	13th	4	3.13	B	19.28	16.2	84.1	Exceedingly long, irregular, rooty lot.
George Steele	"	"	M	20th	13th	5	6.0	a	20.5	16.5	80.4	Very regular, well shaped lot.
Wm. Steele	Reach		....	.....	.....	6	8.1	A	20.25	16.2	80.0	" "
M. Stonehouse	Scugog	Clay loam	M	1st	13th	6	6.0	a	17.75	14.2	80.2	Fair shape, but rooty.
"	"		....	.....	.....	8	2.9	a	20.5	16.7	83.5	Very small beets, like carrots.
John Whitfield	Reach	Clay loam	....	1st	11th	3	7.10	B	14.0	10.0	71.4	Fair shape.
"	"	"	....	.....	11th	3	6.8	B	15.5	12.0	77.4	Better shape and size.

Cobourg District.

Alfred Bell	Hamilton	Clay loam	....	22nd	14th	1	2.11	A	16.0	11.4	71.2	Large, hollow, round beet.
"	"	"	....	22nd	14th	2	2.13	a	17.5	12.5	71.4	Good shape.
John Bowman	"	Clay	M	15th	14th	2	5.0	a	17.25	12.1	70.1	Large beets, good shape.
"	"		M	15th	.....	1	3.8	A				Good shape, but too large.
W. Riddel	"	Clay loam	M	June 20th	17th	6	6.11	B	19.0	16.0	84.2	Very regular, well shaped lot.
James Russel	"	Black clay	M	April 27th	8th	4	5.4	a	17.25	14.0	81.1	Fine regular lot.
W. J. Westington	"	Clay loam	M	May 1st	14th	1	3.0	A	19.25	15.4	80.0	Large, round beet.
"	"	"	....	1st	14th	2	4.2	A				Good shape.
Thos. Hoskins	Haldimand	Heavy clay	....	10th	17th	4	6.13	B	19.0	15.3	80.5	Very good shape.
W. F. Mulholland	"	Clay loam	M	14th	12th	3	7.9	B	18.0	14.4	80.0	Large, fine beets.
T. B. Carlaw	Percy	"	M	10th	30th	3	4.0	B	19.0	15.5	81.6	Grew one acre of roots, product calculated, 26.7 tons.
						2	3.14	B	18.0	15.0	83.3	
						3	4.0	B	17.5	15.5	88.5	

Essex District.

Name of Grower.	Locality.	Kind of Soil.	Manured or not.	Date of Sowing, May.	Date of Extraction, Oct.	No. of beets analysed.	Net Wt. of samples analysed.	Above or below ground.	Analysis of Juice. Brix.	Sugar.	Purity.	Remarks.
							lb.oz.					
Billings & Wagstaff	Gosfield	Gravelly loam	....	4th	.....	3	3.14	B	11.0	11.0	73.3	Fair shape.
A. Wilson	Maidstone	Rich loam ..	....	14th	4th	4	4.4	B	16.5	13.5	81.8	Good shape.
J. Walter	"	" ..	....	14th	4th	1	2.11	B	16.5	13.5	81.8	Very fine shape.
R. Wigle												
R. Croft												
D. Hensam												
Ellis	"	" ..	...	.....	.....	2	2.13½	B	17.5	13.5	77.2	Small, round beets.
David Hensam	"	" ..	M	.....	.....	2	1.6	B	18.0	14.5	80.1	Small, slender roots.
John Walters	Colchester	" ..	....	.....	.....	2	2.3	B	19.0	16.0	84.2	Small; very good shape.
Milne	"	" ..	....	.....	.....	2	2.5	B	17.5	13.8	78.9	Small, round beets.
A. McDonald	Ridgetown	Gravelly loam	M	27th	25th	2	8.3	A	16.0	11.5	71.8	Very long roots.

Oakville District.

John Wilson	Trafalgar	Sandy loam..	M	1st	10th	2	4.6	a	18.5	14.2	76.7	Good shape.
"	"	" ..	....	1st	10th	1	3.0	A	16.5	13.2	80.0	Fair shape.
John Hilton	"	Clay loam ..	....	1st	10th	2	2.9	B	18.0	14.8	80.5	Very good shape.
"	"	" ..	....	1st	10th	1	2.3	B	18.25	14.7	80.5	Very perfect shape.
James Hill	"	Sandy loam..	....	8th	10th	1	4.12	A	13.25	10.0	75.4	Very large beet.
"	"	" ..	....	8th	10th	2	3.6	B	16.5	14.1	84.8	Very fine beets.
"	"	" ..	....	8th	10th	2	1.5	B	16.25	14.0	86.1	
E. H. Robson	Waterdown ...	" ..	....	24th	10th	3	3.11	B	19.0	14.2	74.4	Well-shaped, regular lot.
Chas. Fothergill	Appleby	Clay loam ..	M	24th	10th	1	3.12	A	16.5	11.7	70.9	Large, well-shaped beet.
"	"	" ..	M	24th	10th	2	1.14	B	18.7	14.2	75.9	Well-shaped beets, but too small.
David Allen..	N. Grimsby ...	....	....	.....	.....	3	5.7½	a	15.5	12.0	77.4	Fair shape.

Bay of Quinte District.

Name of Grower.	Locality.	Kind of soil.	Manured or not.	Date of Sowing, May.	Date of Extraction, Oct.	No. of beets analysed.	Net weight of samples analysed.	Above or below ground.	Analyses of Juice. Brise.	Sugar.	Purity.	Remarks.
Rathbun	Deseronto					6	7.7	B	18.5	15.0	81.0	Very regular, well shaped.
"	"					2	3.0	B	16.0	13.0	81.3	Fair shape.
C. Weese	Ameliasburg					2	5.7	A	15.25	11.0	72.1	Large, green tops.
"	"					2	5.2	B	19.00	15.8	83.1	Good shape, better than preceding.
W. R. Dempsey	"					2	3.11	A	17.5	13.0	74.3	Fair shape.
O. Hinch	Camden					2	8.10	B	15.0	11.0	73.3	Very large; poor shape.
"	"					2	3.14	B	17.5	14.0	80.0	Fair shape.
"	"					2	3.12	B	17.0	14.0	82.4	Best of the sample.

Various.

E. Berwick	Shelburne	Heavy clay				2	4.11	A	18.7	13.3	71.1	Good shape.
C. B. Hunt	South London.	"				10	5.6	B	17.0	14.0	82.3	Very good shape, but too small.
John Hunt	"	Clay loam				4	2.14	B	19.0	16.5	81.5	Small, well-formed beets.
James Leslie	Toronto			15th	26th	10	7.10	a	17.75	13.5	76.0	" "
Rathbun	Deseronto					6	7.7	B	18.5	15.0	81.0	Very regular, well-shaped lot.
Wm. Cowan	Pickering					1	3.12½	A	15.8	11.0	68.9	
E. E. Burkinshaw	Gravenhurst	Garden, vegetable.		21st	29th	3	10.6	A	17.0	11.0	64.7	Very large, poor beets.
J. & J. Witchell	Vaughan					5	3.14	B	19.5	16.0	82.1	Fine beets.
"	"					4	3.9	B	18.0	15.0	83.3	"
"	"					3	5.8	B	16.8	13.5	80.3	Larger beets.
T. R. Wadsworth	Weston					3	4.0	a	14.0	10.8	77.1	Fair shape, above ground.
"	"					3	5.8	a	15.0	11.0	73.3	Larger size.
"	"					3	3.14	a	15.5	12.0	77.4	
J. & J. Neilson	Scarboro'					4	3.8	A	17.8	13.0	76.6	Large.
"	"					3	4.5	a	19.0	15.0	78.9	Larger, but better grown.
"	"					3	5.18	a	18.5	15.0	81.1	Better beets.
S. Page	Pelham					4	3.9	B	21.0	17.5	83.3	Small; little withered.
B. W. Murray	Toronto					4	6.4	a	17.3	14.0	80.9	
	Parkhill					4	18.4	A	14.0	9.5	67.8	Enormous, poorly grown.

REPORT OF THE METEOROLOGICAL OBSERVATIONS, LYSIMETERS, SOIL THERMOMETERS, DRAINAGE WATERS, Etc.

Made and Compiled by C. A. Zavitz, B.S.A., for the Chemical Department.

Observations on soil, temperature, drainage waters, etc., were taken this season as during the previous years. The instruments were placed in order on April 30th and a record of the readings made, commencing at May 1st and continuing until September 30th.

About the 1st of July a number of ground thermometers of different depths were unfortunately broken, and as these instruments are obtained from New York the vacancies could not be filled in time to be of much practical value during the present year.

No. 1 lysimeter was loam with sod, No. 2 loam with barley, No. 3 loam with bare fallow, No. 4 sand with barley, No. 5 clay with barley, and No. 6 loam with barley. On May 1st, 1889, a fertilizer containing nitrogen, phosphoric acid and potash was applied to each lysimeter at the rate of 600 lbs. per acre.

The following tables give the condensed summaries of the various observations taken during five summer months of 1890.

Rain gauge.—The rain which fell during the five months (May 1st to September 30th) as compared with that for the same period of the three previous years was as follows:

	1887.	1888.	1889.	1890.
	in.	in.	in.	in.
May	1.58	1.08	3.59	2.18
June	2.36	2.92	4.25	5.31
July	.61	2.21	2.67	1.44
August	2.71	2.16	1.92	1.74
September	1.52	1.55	1.04	.72
	8.78	9.92	13.47	11.39

Lysimeters.—The amounts of drainage water received from the lysimeters for each month was as follows:

May —Sod loam	5,140	cubic centimetres.
" Sand	8,877	"
June—Sod loam	8,140	"
" Barley loam	7,675	"
" Loam	4,055	"
" Sand	4,745	"
July—Fallow loam	3,915	"

Average for each thermometer for each month and for whole period.

Instruments.	May.	June.	July.	August.	September.	Average of the whole.
Barometer	28.752	28.852	28.893	28.916	28.955	28.
Attached thermometer	52.5	78.6	71.9	66.2	58.6	63.9
Temperature of air	50.7	65.4	68.2	62.8	55.4	60.5
Temperature, maximum	62.2	75.6	78.8	74.1	68.1	71.7
Temperature, minimum	40.2	56.2	54.2	51.6	43 9	49.2
Soil temperature 3 inches in sand	51.6	66.8	70.1	67.7	58.4	62.7
" 3 " clay	51.4	65.9	71.9	68.6	60.6	63.6
" 3 " loam	51 0	65.1	69.3	68.3	58.9	62.4
" 9 " clay	49.9	64.4	68.9	67.2	58.7	61.7
" 9 " loam	49.4	63.8	68.6	67.3	58.8	61.5

Greatest variation in temperature of each thermometer between two readings (*a*) Increase, (*b*) Decrease.

Situation of Thermometer.	Increase.				Decrease.			
	Date.	From.	To.	Variation.	Date.	From.	To.	Variation.
Temperature of air	Sept. 30.	34.1	69.3	35.2	June 26. Sept. 30.	83.0 69.3	62.0 48.3	21.
Thermometer in sand at depth of 3 inches....	Aug. 7.	59.2	86.4	27.2	May 26.	73.4	57.7	15.7
" clay " 3 "	Aug. 7.	59.0	91.3	32.3	Aug. 8.	94.6	72.8	21.8
" loam " 3 "	Aug. 7.	57.6	88.8	31.2	June 2.	77.2	60.6	16.6
" clay " 9 "	Aug. 15.	60.0	69.4	9.4	May 3.	65.8	51.2	14.6
" loam " 9 "	May 19.	42.0	51.7	9.7	July 29.	79.6	69.4	10.2

Tables of highest single readings of thermometers at different depths in three kinds of soil with date of same (for air also).

Situation of Thermometer.	Date of maximum temperature.			Maximum temperature.
	Month.	Day.	Hour.	
Temperature of air	August.	4	1 p.m.	88.1
Thermometer in sand at depth of 3 inches.....	"	1	1 p.m.	89.8
" clay " 3 "	July.	29	1 p.m.	95.5
" loam " 3 "	August.	8	1 p.m.	91.4
" clay " 9 "	"	4	9 p.m.	78.5
" loam " 9 "	"	3	9 p.m.	81.3

In addition to these investigations there has been the usual amount of correspondence with farmers and others in reference to matters of interest to them. On the whole the year's work has been both pleasant and, I trust, profitable, and has shown marked signs of development. With increased help and still greater scope for our work I trust the work of the year 1891 may prove still more pleasant and more profitable.

Through you to the Minister of Agriculture I beg to submit this report.

Yours respectfully,

C. C. JAMES,
Professor of Chemistry.

Chemical Laboratory,
Ontario Agricultural College,
December 31st, 1890.

PART IV.

REPORT OF THE

PROFESSOR OF VETERINARY SCIENCE.

To the President of the Ontario Agricultural College:

SIR,—In submitting my annual report I am glad to be able to state that the health of the stock upon the farm has been good on the whole. Considering the amount of stock kept, we have had very little sickness and not many fatalities.

HORSES.

The horse stock has been unusually healthy, and beyond a few slight cases of colic and minor casualities there has been very little trouble.

For appearance sake at least, I would like to see the horses in rather higher flesh, and present a more vigorous appearance. Unfortunately, these animals labor under the same unfortunate circumstances that the horse stock upon most of the farms of Canada do. That is, that they have not nearly enough work during the winter to give them exercise, and what work they have comes by fits and starts, so that it would not be safe to give them full rations. All at once in the spring they are plunged into hard, heavy work, when they are not in a condition that fits them for it; so that they fail rapidly and never have a chance to recover, as they are worked to their fullest capacity until the season falls again, when their work is not sufficient to allow of their being got into good condition.

A WEAK FOAL.

A mare that works in the garden dropped a foal that was somewhat weak. Her supply of milk was small, and it did not appear to be properly constituted, as the foal took to scouring profusely, which we could not arrest, until we fed the young animal on cow's milk and with-held the mother's.

However, it did not gain in strength and could not get on its feet without being lifted, and soon became a victim to that bane of colt flesh called "Joint Ill," so that we considered it more humane to put it out of its suffering, as there seemed little chance of its ultimate recovery in the face of such discouraging complications.

The year before the same mare dropped a fine, strong, healthy foal that never ailed a day—a full sister to the one that died—and nearly every one that saw the mare prophesied that her foal would not do well, as she was so very fleshy. This year she was very decidedly lower in flesh, and as I have explained had ill-luck with her foal.

This is some evidence that a high state of flesh is not always to be assigned as a cause of ill-success in breeding; although there is no doubt that moderate condition is more favorable in the majority of instances

Tape-Worms in Lambs.

I explained in former reports losses that have resulted from the action of tape-worms upon the College lambs. Last spring we had a similar experience, although the mortality was kept within smaller limits, only some half-dozen lambs succumbing from the ravages of the worms, as we were enabled from the benefit of past experience to take prompt action in the administration of medicine to cause their expulsion. As I explained in a former report, Oil of Male Shield Fern is the agent used, and we give from ten to twenty-five drops at a dose according to the size of the lambs.

They should not be allowed any solid food for twelve hours, and should be encouraged to drink linseed tea prior to getting the Shield Fern. We used to give raw linseed oil in preparing for the dose, and although the laxative action produced by it was an advantage in aiding the action of the Sheild Fern, still we found it had an extremely nauseating effect, causing much coughing and depression, and I intend in the future to with-hold it, and rely upon starving and the linseed tea.

The medicine should be mixed with a wineglassful of linseed tea and poured down. If the expulsion of worms has not been as free as it should have been, the dose may be repeated in twelve hours.

Since I previously reported upon this subject I have made some inquiries as to the existence of this trouble in other parts of the continent, and find that its occurrence is by no means rare. I have also come in contact with it on numerous occasions in different parts within a radius of ten miles from Guelph. It is regretable that helminthologists have not yet discovered the life history of this worm—*Tænia expansa*—as we might then be in a position to prevent its ravages upon lambs.

I do not know of any cases where injury has been done to adult sheep by these worms.

It is considered by helminthologists that tape-worms in order to complete their life history, or in other words to develop from eggs to mature tape-worms, must pass through some other form of animal life before they can reach their mature stage, and infest the animal which they are naturally inclined to attack. For instance, after the eggs leave the segments of the tape-worms, that are expelled from lambs, these eggs are not simply taken up again by lambs and developed into worms in the lambs bowels, for if they were so taken up, they would never complete their life history in these hosts, but would be expelled without maturing. So it has been determined, that these worms in their undeveloped stages or larval form, have to enter some other living host, in order to proceed with their development. Now, if this intermediary bearer or host can be discovered and destroyed, then the development of these worms and their consequent ability to do harm is arrested. Acting upon the theory that some slug or mollusc might be the intermediary bearer, we determined to try a heavy dressing of salt on the pasture that the lambs were put upon two years ago last spring; as salt has been found to be destructive to these low forms of animal life, as in the case of the mollusc that harbors the immature stage of the liver fluke that causes "Bot" in sheep, in the old country. However, it had no marked influence in checking the development of the worms, for they again attacked the lambs that year.

An Experiment.

Last autumn a pure-bred Ayrshire cow seven years old was purchased and brought to the farm. Towards the spring, her attendant finding she was not doing well, requested me to examine her, which I did. I made up my mind at once that she was the victim of "tuberculosis" and had her immediately isolated for further observation. As she was milking at the time, and as there was an available calf, out of a Durham grade cow by a pure-bred Polled-Angus bull, it occurred to me that it would be a good opportunity to test the transmissibility of tuberculosis, through the medium of the milk.

It is a point, that has by no means been satisfactorily settled by observers. Authorities are almost unanimous in the belief that where the tubercular deposit involves the udder, there is the utmost danger to susceptible individuals consuming the milk from that udder; but many hold the view that if the mammary glands are not involved in the deposit, that the danger is slight. In this case the udder was perfectly healthy, hence the opportunity for an experiment was very favourable.

Our patient rapidly declined, in fact from the very first, she presented the symptoms of a typical case of galloping consumption. We kept her for about one month, allowing the calf to suck her during this time. As she began to get pretty weak, we resolved to destroy her and make a *post mortem* for the benefit of the students. Upon opening her we found very extensive deposits of tubercles, both in the chest and abdomen, in fact almost all the organs in these cavities were seriously involved.

The calf was put away by himself and fairly well fed and housed for seven months, when we killed and opened him. During this time he appeared healthy and throve fairly well, his appetite being good, and there was no cough.

I examined him, and took his temperature occasionally, but found nothing abnormal. Upon opening him, however, we found widespread deposits of incipient tubercles. Both pleuræ were dotted all over with small clusters of tubercles, and in the abdomen the liver was spotted externally in a like manner, and also there was a good crop on the sheet of membrane—mesentery—that envelops the bowels, and suspends them to the root of the abdomen.

In fact it was astonishing to observe the extent of the deposits, after having witnessed the apparently healthy state of the young animal during life.

It was consistent, however, with my past observations, that if the tubercular deposits are not sufficiently extensive to interfere with the functions of important organs, there is no appreciable evidence of ill-health resulting from their presence. In order to make this experiment as complete as it might have been made, this calf should have been kept separate, to avoid the chance of infection through the medium of the air, or food of the foster-mother, of which they would both partake from the same box. Unfortunately, however, this calf could not be got to drink milk from a pail, and if he had been let into the cow's box twice a day to suck, he would have been subjected to the same danger from the breath of the cow or from her sputum though in a less degree.

As a matter of fact, I think we are justified in assuming, that the milk was the medium of transmission in this case.

Although recognising that there is some foundation for the theory of infection through the medium of the air, where healthy cattle are kept with tubercular ones, and also from feeding out of the same manger, still concluding from my own experience, I am of the opinion that the danger is slight when compared with that of consuming the milk from a tubercular subject.

Both the sire and dam of the calf are said to be healthy.

It is pretty generally recognised now that human and bovine "tuberculosis" are one and the same disease; hence the necessity for caution in using the milk from a cow, in which there is any suspicion of "tuberculosis," for it would appear that it is just as liable to be transmitted to the human being as to young bovines in this way.

Respectfully submitted,

F. C. GRENSIDE.

PART V.

REPORT OF THE FOREMAN

OF THE

HORTICULTURAL DEPARTMENT.

ONTARIO AGRICULTURAL COLLEGE,
December 31st, 1890.

To the President of the Ontario Agricultural College:—

SIR,—At the close of another year it becomes my duty to show, in some form, the amount of garden produce supplied to the college throughout the year. In doing so it is unnecessary for me to make anything in the way of a report, as I have no doubt Prof. Panton, as heretofore, will do ample justice to the department in that way. I would just say that notwithstanding a favourable season for vegetation and growth generally, through climatic and other causes beyond our control, the fruit crop was poor, both in quantity and sample; but culinary vegetables, of which we had all the leading varieties, were good and abundant in their seasons, sufficient to meet all the requirements of the college, and, as usual, a supply stored for winter use, also a small surplus sold and added to revenue, as shown in the following statement.

Supplied to the College during the year:

January.

Cabbage, 9¼ doz. at 65 cts	$ 6 01¼	
Celery, 16½ doz. at 60 cts	9 90	
Onions, 1½ bush. at $1.50	2 25	
Parsnips, 3¼ bush. at 40 cts	1 30	
Carrots, 3 bush at 30 cts	90	
Beets, ½ bush. at 35 cts	17½	
Turnips, 1 bush at 20 cts	20	
Herbs, 5 bunches at 5cts	25	
Sundries	45	
		$21 43¾

February.

Beets, 1 bush. at 35 cts	35	
Parsnips, 5 bush. at 40 cts	2 00	
Carrots, 5¼ bush. at 30 cts	1 57½	
Onions, 3 bush. at $1.50	4 50	
Cabbage, 11 doz. at 65 cts	7 15	
Celery, 1 doz. at 60 cts	60	
Herbs, 14 bunches at 5 cts	70	
Sundries	60	
		17 47½

March.

Carrots, 6 bush. at 30 cts	$1 80	
Beets, ½ bush. at 35 cts	17½	
Parsnips, 7¼ bush. at 45 cts	3 26¼	
Onions, 3½ bush. at $1.50	4 87½	
Cabbages, 10 doz. at 65 cts	6 50	
Herbs, 6 bunches at 5 cts	30	
Sundries	30	
		$17 21¼

April.

Carrots, 7 bush. at 30 cts	2 10	
Beets, 1½ bush. at 35 cts	52½	
Parsnips, 7¼ bush. at 45 cts	3 26¼	
Shallots, ½ bush. at $1.50	75	
Cabbage, 6½ doz. at 70 cts	4 55	
Sundries	60	
		11 78¾

May.

Lettuce, 13 bush. at 60 cts	7 80	
Parsnips, 4 bush. at 35 cts	1 80	
Rhubarb, 7½ bush. at 70 cts	5 25	
Carrots, 3 bush. at 30 cts	90	
Asparagus, 360 bunches at 4cts	14 40	
Sundries	75	
		30 90

June.

Rhubarb, 15½ bush. at 60 cts	9 30	
Lettuce, 8 bush. at 50 cts	4 00	
Spinach, 17 bush. at 40 cts	6 80	
Peas, ½ bush. at $1	50	
Asparagus, 940 bunches at 4 cts	37 60	
Onions, 130 bunches at 5 cts	6 50	
Gooseberries, 42 qts. at 6 cts	2 52	
Strawberries, 73 boxes at 7 cts	5 11	
Sundries	30	
		72 63

July.

Lettuce, 14 bush. at 40 cts	5 60	
Peas, 8¾ bush. at $1	8 75	
Rhubarb, 7¾ bush. at 50 cts	3 87½	
Spinach, 2 bush. at 40 cts	80	
Potatoes, 6½ bush. at $1.50	9 75	
Asparagus, 320 bunches at 4 cts	12 80	
Onions, 61 bunches at 5 cts	3 05	
Beets, 47 bunches at 5 cts	2 35	
Carrots, 58 bunches at 5 cts	2 90	
Strawberries, 217 boxes at 6 cts	13 02	
Raspberries, 197 boxes at 7 cts	13 79	
Cherries, 8 boxes at 6 cts	48	
Currants, 145 boxes at 6 cts	8 70	
Currants, black, 21 qts. at 12 cts	2 52	
Gooseberries, 156 qts. at 6 cts	9 36	
Beans, 80 qts. at 5 cts	4 00	
Herbs, etc	30	
		102 04½

August.

Potatoes, 19 bush. at 70 cts	$13 30	
Lettuce, 3¾ bush. at 30 cts	1 12½	
Beets, 1¼ bush. at 30 cts	37½	
Peas, 3½ bush. at $1	3 50	
Rhubarb, 10½ bush. at 50 cts	5 25	
Carrots, 1 bush. at 40 cts	40	
Apples, hand-picked, 15 bush. at 60 cts	9 00	
Apples, fallen, 1½ bush. at 30 cts	45	
Tomatoes, 6 bush. at 75 cts	4 50	
Cabbages, 6½ doz. at 50 cts	3 25	
Corn, 44 doz. at 8 cts	3 52	
Celery, 7½ doz. at 50 cts	3 75	
Vegetable marrow, 1½ doz. at 50 cts	75	
Cucumbers, 20½ doz. at 10 cts	2 05	
Cucumbers, pickling, 2,705, per 100, 20 cts	5 41	
Beans, 48 qts. at 5 cts	2 40	
Raspberries, 21 boxes at 7 cts	1 47	
Onions, 15 bunches at 5 cts	75	
Herbs, 7 bunches at 5 cts.	35	
Sundries	20	
		$61 80

September.

Potatoes, 11½ bush. at 40 cts.	4 60	
Apples, picked, 5¼ bush. at 50 cts	2 62½	
" fallen, 2 bush. at 25 cts	50	
" crab, 4¼ bush. at 60 cts	2 55	
Tomatoes, 17½ bush. at 60 cts	10 50	
" green, 8 bush. at 50 cts	4 00	
Lettuce, ½ bush at 40 cts	20	
Onions, ½ bush at $1	50	
Pears, 2 bush. at 80 cts	1 60	
Corn, 21 doz. at 8 cts	1 68	
Cabbage, 5¼ doz. at 50 cts	2 62½	
Cauliflower, 5½ doz. at 75 cts	4 12½	
Celery, 6¾ doz. at 50 cts	3 37½	
Cucumbers, 1½ doz. at 10 cts	15	
Peppers, 2 doz. at 12 cts	24	
Plums, 400 qts. at 4 cts	20 00	
Grapes, 250 lb. at 5 cts	10 00	
Grapes, 147 lb. at 3 cts	4 41	
Melons, 15 at 5 cts	75	
Squash, 6 at 5 cts	30	
Herbs, etc	25	
		74 98

October.

Potatoes, 113 bush. at 40 cts	45 20	
Turnips, 7 bush. at 15 cts.	1 05	
Onions, 3¾ bush. at 90 cts	3 37½	
Tomatoe, 1¼ bush. at 70 cts	87½	
Apples, good, 59 bush. at 50 cts	29 50	
" inferior, 2 bush. at 25 cts.	50	
Beets, 2 bush. at 30 cts	60	
Carrots, 1¾ bush. at 30 cts	52½	
Parsnips, 2 bush. at 40 cts	80	
Celery, 23 doz. at 50 cts	11 50	

Corn, 14 doz. at 8 cts	$1 12	
Cabbages, 10¾ doz. at 50 cts	5 37½	
Cauliflower, 12½ doz. at 70 cts.	8 75	
Melons, 142 at 4 cts	6 48	
Citrons, 100 at 6 cts	6 00	
Vegetable Marrow, 250 at 5 cts	12 50	
Bos. M. Squash, 28 at 6 cts	1 68	
Herbs, 7 bunches at 5 cts	35	
Sundries	45	
		$136 63

November.

Onions, 2 bush. at $1	2 00	
Turnips, 5¾ bush. at 15 cts	86¼	
Carrots, 2¼ bush. at 30 cts	67½	
Parsnips, 3¾ bush. at 40 cts	1 50	
Beets, 1½ bush. at 35 cts	52½	
Artichokes, 1 bush. at $1	1 00	
Celery, 19½ doz. at 60 cts	11 70	
Cabbage, 4¾ doz. at 50 cts.	2 37½	
Cauliflowers, 4 doz. at 70 cts.	2 80	
Cabbage, pickling, 50 at 5 cts	2 50	
Herbs, 13 bunches at 5 cts.	65	
Sundries	45	
		27 03¾

December.

Onions, 1¼ bush. at $1	1 25	
Salsify, 1½ bush. at $1	1 50	
Parsnips, 2½ bush. at 40 cts.	1 00	
Carrots, 1 bush. at 30 cts	30	
Turnips, 3½ bush. at 15 cts.	52½	
Beets, ½ bush. at 35 cts.	17½	
Cabbage, 6½ doz. at 50 cts.	3 12½	
Celery, 15½ doz. at 60 cts.	9 30	
Herbs, 10 bunches at 5 cts.	50	
Sundries	30	
		17 97½

Total supplied to College at current rates	$591 91
Sold for Cash	79 55

Your obedient servant,

JAMES FORSYTH.

December 31st, 1890.

PART VI.

REPORT OF THE PHYSICIAN.

To the Honorable JOHN DRYDEN,
Minister of Agriculture:

SIR,—I have the honour of presenting to you my Annual Report.

Owing to the almost simultaneous appearance of an epidemic of measles and la grippe, after the Christmas holiday of eighteen hundred and eighty-nine, we could not prevent the spread of those diseases, as no provision had been made for isolating the patients that were under treatment.

Several of the students who never had measles before had to run the course of both diseases before making final recovery.

I am glad to be able to report that, according to instructions given by you, two comfortable rooms with their appurtenances are almost ready for use.

During the rest of the year, we have had nothing of an unusual character occur.

The college is in a good sanitary condititon.

I have the honor to be, Sir,
Your obedient servant,

E. W. McGUIRE, M.D.,
College Physician.

December 31st, 1890.

PART VII.

REPORT OF THE

PROFESSOR OF AGRICULTURE.

ONTARIO AGRICULTURE COLLEGE AND EXPERIMENTAL FARM,
31st December, 1890.

To the President:

SIR,—I have the honor of herewith submitting my report for the year of 1889 for the respective departments of this institution under my more immediate supervision. These include in addition to my own report, those of Mr. C. A. Zavitz, assistant in the experimental departments, and Mr. J. E. Storey, the farm foreman.

The year 1890 was not more favorable to successful farm management in Ontario than the year 1889, owing to the unusual amount of the rainfall during the months preceding the reaping of the harvest. So excessive was this rainfall in the neighborhood of Guelph, that for days in succession during the month of May and the first half of June, no work could be done on the land in the line of cultivation. The growth resulting from so great an amount of moisture in the soil was excessive, and the promise of an enormous yield on the approach of harvest was most cheering, but the hot days of July during the formative period of young grain in the ear soon rendered it apparent that this hope was illusive.

The year, however, has on the whole been a very successful one, as will be apparent to all who can find time to examine the financial statement on another page. From this statement it is manifest that the farm proper has more than paid its way during the year 1890. It was publicly announced by the Hon. Chas. Drury, during his term of office, that he thought the farm proper separate from the work of an experimental nature should not be a burden to the farmers of this Province, but that on the other hand it should at least produce revenue enough to cover the expenditure. During the year 1889 it was simply useless to attempt to realize this object, because of the confusion in management resulting from the burning of the buildings. The effort was made, however, during the year now drawing to a close, with the result which has already been mentioned.

While I am free to admit that the mere making of the farm proper pay its way, is not by an means the most important object of its existence or that is sought in its management, it is of much importance to the farmers of this country to know that it is managed with a due regard to economy. The most convincing evidence of economical management is to be found in a balance sheet on the right side. I do not know that it is the mind of the department to have the accounts so kept in future that the gain

or loss from the farm proper may be known from year to year. If this should be decided upon, however, it is my firm conviction that good management would show a balance sheet on the right side every year, or if not every year, the average of gains would more than overbalance the average of losses.

The improvements undertaken during the year relate chiefly to the repairing of fences, the re-making of roads bordering upon and within the farm, the destruction of weeds and the removal and reconstruction of a sheep barn.

Improvement of Roads bordering on the Farm.

In the month of August the portion of the road between the Townships of Guelph and Puslinch which was left without gravel last year was completed. The construction of this road is given in the report for 1889, page 103. As soon as the ground was dry enough in the spring, mixed grasses were sown along the side of this road on the entire space between the gravel and the fence on either side. It grew luxuriantly and was twice cut with the mower. This not only prevented any weeds from going to seed, but added much to the pleasing appearance of the road.

The Brock road running in front of the college grounds was taken in hand in the spring as soon as the grain had been sown. The fences on its sides were removed and the sod turned over from the head ridge in the bordering fields to the travelled portion of the road. The ploughing was repeated three times on some portions and four times on others, and the ground was harrowed and levelled between the ploughings. The bordering ditches were then made by first marking them out with the plough, and after this by using the scraper in the grading. The road-bed was made 38 feet wide between the outmost edges of the ditches. The slope from the centre outward was made just enough to drain the water off readily, and not so violent in any part as to hinder the use of the mower in cutting grass or weeds.

Before any ploughing was done the stones were gathered from the sides of the road where they had been deposited sometime, by some one, in numerous heaps in the years that are gone, and were drawn away to be put in the bottom of another road. It seems to be the practice with some road-masters in caring for gravel roads to throw aside into the grasses upon the borders all the stones that work up through the gravel, instead of breaking them or drawing them entirely away. This practice renders the borders very unsightly. It is not fair to the owner of the property bordering upon the road. It was from this source, however, that a number of the stones came which were removed from this road. There is very much public travel on this road and this accounts for the more than average width of the road-bed decided upon, and for the further fact that when the gravel was put on it was spread to the width of eighteen feet. This allows two teams to pass ordinarily without leaving the gravel.

The gravel was applied as soon as the grading was completed. It was spread by Mr. Squirrel this year again and with an evenness fully equal to that evidenced in this work the previous year. In the centre of the road the depth would be fully six to seven inches and less toward the sides. No stones were drawn in the gravel larger than one's fist and but few half so large. At least this was the aim, and even these were continually raked forward and covered as the work proceeded. After the gravel had been put on it was twice raked toward the centre and twice rolled with a heavy roller, insomuch that it became very smooth and solid by freezing up time. When the teams were unloading the gravel they were required to go forward a short distance and turn in one place. This prevented the scattering of the gravel where it was not wanted and the making of an unsightly job, while the time lost in consequence was scarcely appreciable.

The county bore a part of the expense of drawing the gravel. Another portion was borne by the Government, and a portion of the work was done by the farm teams. The whole of the labor of ploughing and leveling the sides of the road was done by the farm teams and farm help, as was also the removal of the stones and the grading of the road. It was also done without any special grant for the purpose. Such times were chosen for doing it as would not interfere seriously with other farm work. The borders between the fences and the travelled portion will be sown with grass in the spring.

The grading done late in the autumn of 1889 on the private road on the north side of the Brock road was much marred by the excessive rains of early spring, insomuch that it was determined to re-summer fallow the borders again. This was done and alsowhatever additional grading was required. Posts were also set eight feet apart and one foot from the outer edge of the ditches which border on the roadway. On a portion of this line of posts the fence is completed. It consists of a bottom board 1x1½ inches, planed, and a top piece 2x4 also of pine and planed. This piece is nailed upon the side of the posts. The top side of this scantling is three feet from the ground. The bottom piece is let into the posts one inch, the top piece 1½ inches. The space between these two pieces is filled with wire netting. The object of this inner fence is to protect the trees which, in the spring, are to be planted along the borders.

The private road on the south side of the Brock road was also taken in hand. After the whole road had been ploughed, the road-bed was scraped out to the width of nine feet and to the depth of say ten inches. This cavity was then filled with small stones to the depth of six to eight inches, deeper in the centre and slightly sloping toward the sides. These stones were gathered from the fence corners of the fields and also from portions of the road itself, where they had been strewn about in objectless accumulations. The work on this road stands thus, and will be pushed to completion another season. In all these improvements the rule has been followed thus far to do no more than can be accomplished by the staff of farm workers, and by the farm teams when the labor of these is available, without in any other way neglecting the other farm work. Thus it is that the ordinary farmer carries on his work if it is to be economically done, and I see no reason why this rule should be departed from here. It can never be said regarding the improvements on the farm that they are completed so long as the principle of decay is operative, hence the widsom on the part of the progressive farmer, of continuing these from year to year.

The Destruction of Weeds.

The war against the multitudinous forms of vagrant weed-life which infested the farm and also the bordering highways, was renewed with the coming of the springtime, but the strong effort in this direction was made after the middle of June, and more especially in the months of August, and early in September. But little, comparatively, can be done in ordinary farming in early spring, in destroying weeds, other than what is accomplished by the usual modes of cultivation. The thistle crop was not so abundant after the scourging of the previous year. This may also be said of the wild flax, the ragweed, the mustard, the blue weed, the sow thistle and the burdock. The ox-eye daisy gave but little trouble after the treatment described in the report of last year. The couch grass has been given one more year of life. Hitherto it has been entrenched mainly behind the protection of meadow land, and so has been thus far unmolested.

The means adopted for the destruction of weeds were similar to those of last year, and included (1) hand pulling, (2) the use of the spud, (3) the growth of hoed crops, and (4) autumn cultivation.

The *hand* pulling is specially applicable to the eradication of mustard and wild flax. It is only possible, however, when these exist in limited quantities in the crops, as otherwise the cost of the operation would be too much. It can be best done in conjunction with spudding, when other weeds requiring this are present. Wild flax is usually present only in meadows and fields sown to autumn grains, as rye or winter wheat, and unless pulled shortly after blossoming, the seed will shed abundantly. Wild flax is one of the most dangerous weeds now found in this province, and one of the most difficult to dislodge. Mustard is more troublesome, as is generally known, in spring sown grains, and so long as it is allowed in any degree to ripen on a farm, that farm will never be entirely free from it.

Spudding is applicable to the destruction of nearly every form of weed life found in meadows, grain crops, or pastures. Its utility is subject to the same restrictions as hand pulling, depending largely on the numbers in which the weeds are present. When they are very numerous, some other mode of eradication must be rssorted to. It will be found specially serviceable when fields have once been virtually cleaned, in keeping them in this

condition. When this plan is adopted, any of the more troublesome forms of weed life are detected at the outset, and so do not easily get a foothold. I am fully impressed with the conviction that when once a farm is made fairly clean, it cannot be kept so without resorting to this plan, and that in no other form can labor be expended with this object in view that will give so good a return for the outlay. The grain fields were all gone over, spud in hand. The pastures were gone over twice, including the unbroken land enclosed along with the forests. The number of hours employed in this way during the summer of 1890 was 498½ or 49 4.5 days of one person's labor.

Our great reliance for the eradication of weeds on this farm is the growing of *hoed crops*. Where these will grow well, I do not see any necessity for the use of the bare fallow. We are cleaning this farm without resorting to its use at all. We had 108 acres in hoed crops the past summer. Of this amount, 54 acres were rape, 19 acres corn, 20 acres field roots, and 7 acres potatoes. All of this was badly infested with thistles and other forms of weed life. It would not be incorrect to say that it is clean now, so far as this can usually be said of any piece of land. In addition to the work done by the horse hoe on the hoed crop, it was gone over twice at least with the hand hoe, so that by harvest time no weeds could be found upon it at all approaching the blossoming stage.

Of all the crops which we grow, as aids in the destruction of weeds, rape is with us the favorite, and the potato crop is least in favor. With the latter, the tops die so soon, and cultivation ceases at a period so early, that the thistles at least put in an appearance again, and regain much of that hold upon the soil, of which the earlier cultivation had deprived them. When the rape is grown in conjunction with rye and properly cared for, the weeds have small chance of a long lease of life. The rye is sown in autumn, and in the spring is cut for the silo, or pastured as may be desired. The ground is then ploughed about the first of June, or a little later, and the rape is sown about the last week in June. The turning over of the ground in June, and the after cultivation during a dry period of summer is most efficacious in destroying the weeds. The rank growth of the rape leaves so excludes the light after the cultivation ceases, that there is small chance for the growth of weeds. If any weeds are allowed to go to seed along the line of the row, this is a very weak point in the cultivation. The weak point, usually, in all cultivation of hoed crops is usually discernible in the later stages of growth. If they were gone over once or twice with the hand hoe after all horse labor ceases, and all stray weeds and thistles cut off, the farmer would be abundantly remunerated for his outlay. The time occupied in this work when the preceding cultivation has been of the right sort, need not be more than one day for three or four acres.

The cheapest labor factor in the destruction of weeds is probably that of *Autumn cultivation*, and it is certainly one of the most effective. It consists in ploughing the land lightly as soon as possible after harvest, where a crop of grain or grass has been grown, and on which a spring crop is to be sown the following year. The gang plough will answer very well where thistles are not plentiful. Where they are plentiful, the ordinary plough with a clean cutting share should be used, and the ploughing should not only be light, but most carefully and thoroughly done. When fresh weeds appear plentifully on this upturned soil, it will well repay the labor to run over it with the harrow some weeks before it is finally turned over for the crop, when the freezing time is approaching. All the land we had which required this treatment received it.

I desire here to say to the farmers of this province, I see no reason why we should not have clean farms in all Ontario. It remains with each farmer to say that his farm will be clean, and so it shall be. The method which allows the farm generally to accumulate the elements of weed life and which then makes a dash at one field by means of the bare fallow will never prove completely successful. There must be unremitting vigilance all along the line and through all the years. The objection has already been raised that it is comparatively easy for us to clean a farm, and to keep it clean, where we have so much available labor. I answer, we account for all labor employed on the farm, and pay for it from the same.

The Removal of the Sheep Barn.

The sheep barn, which was removed and remodelled, stood directly in the line of the private road which runs past the creamery barn. It was old and infirm, and bordered very closely on the realms of unsightliness and dilapidation. This building, which had no sills, was taken down and re-erected on the southerly side of the yard connected with the creamery barn. A good foundation of stones was placed under it, and a commodious loft put into it for the storing of hay and bedding. It has ample yard room in front.

The uses to which this sheep barn is to be devoted are three-fold. First, it will provide shelter in time of autumnal storms for lambs that may be pasturing on rape or otherwise. Second, it will answer well for the wintering of sheep belonging to the farm, owing to the roominess of the building and of the yards in front; and third, in the summer season it will provide accommodation for any kind of stock when this may be necessary.

Special Crops Grown upon the Farm During 1890.

The special crops grown upon the Farm during 1890 consisted of tares or vetches, rye for pasture and soiling, rape, and sugar beets. The term *special* here is applied to these crops for the reason that they are not usually grown by the Ontario farmer, and they have all been grown by us for purposes of experiment.

Tares or Vetches.—This crop was grown with the following objects in view, viz.: —(1) To ascertain whether the crop is a paying one in this locality, or whether it can be made so. (2) To ascertain whether they can be so grown that no trouble will arise with the succeeding crop from the prolonged presence of the tares in the soil. (3) Whether they may not be grown in Ontario in sufficient quantities to reduce the cost to the farmer when purchasing seed The growth of tares in conjunction with oats, or with oats and peas for soiling purposes, is rapidly on the increase in this country, but the farmer has hitherto paid about two dollars per bushel for his seed. When I mention this I do not in any way intend to reflect upon the seedsmen of this province. I affirm, however, that it is more than the farmer can well afford to pay for his tares. If the price of the seed could be brought down to one dollar per bushel, the growth of tares for soiling purposes would be very much extended. As one factor in a soiling crop they are very useful, and the growth of soiling crops is happily coming more and more into favor with the farmers every year.

The attempt this year could not be called a success by any means. The tares were sown on a loamy soil, and on a fall-ploughed piece of land where oats had grown the previous year. They were sown with the drill May 1st, and at the rate of 1½ bushel per acre. They grew with great rapidity during the following weeks of very showery weather. On June 25th they presented a beautiful appearance, but closer inspection made manifest a rankness, and at the same time a sappiness and tenderness of straw that were ominous. About July 1st the whole plot was covered with purple blossoms, and in its attractiveness was full of deceitful promise. During the early days of July, which were intensely warm, the rankest portions of the field withered like the gourd. Other portions of lightest growth retained the dark shade of luxuriant growth, and intermediate portions took on a lighter tinge, indicating considerable derangement in the processes of nutrition. The crop evidently ripened prematurely and yielded only from five to six bushels per acre. These brought when sold, $1.50 in the Toronto market. Pease in the same field and sown about the same time, yielded twenty-five bushels per acre. The tares, when removed, were followed by a crop of rye, which is being grown for the silo, and which will be followed by a crop of rape.

Rye for Pasturing and for the Silo.—Twenty-six acres of rye were sown in the autumn of 1889 to produce pasture. The open winter injured the portions of the field containing a humus soil, by the constant succession of freezings and thawings. The pasturing commenced soon after the rye had made a good start in the spring, and continued until June 10th, when the field was ploughed for rape. It was pastured with both cattle and sheep, and the results were fairly satisfactory.

Twenty acres of rye were also sown in field No. 1 in the autumn of 1889 with the object of cutting it with the binder, curing one-half of the rye in the shock and putting the other half into the silo. It was our intention to use the cured portion as hay, that is, to run it through the cutting box and mix with other food as we now use the hay which is given to the cattle. The open winter also injured this crop somewhat in the low parts where black soil was plentiful. The excessive rains in June rendered it impossible to cut the rye at the proper stage for curing, and before a team could do the work of cutting at all in the low parts without poaching, the crop had passed even the best stage at which it should go into the silo. It was cut at length about the middle of June, run through a cutting box and put into the silo. It had no other covering in the silo than from six to twelve inches of cut straw. When the rye was removed from this field the ground was at once ploughed for rape, which was sown during the first days of July.

The silo was opened about August 1st and the stock kept inside were given a portion of the rye along with a sprinkling of meal intermixed with it. The animals did not take kindly to it for the first two or three days, but eventually became very fond of it, and so far as we could judge did well upon it. As we had anticipated, a portion of the rye adjoining the walls of the silo was injured because of the over woody stage at which it was put into the silo. All the rest of it was sweet and good.

The fields chosen for the rye were both overrun with thistles, and to clean them was one principal object in view when the rye was sown. When followed by a crop of rape that is sufficiently cared for, this object can be attained in finest form. A crop of rye and a crop of rape can both be secured from the land, and the land will at the same time be as effectively cleaned as though it had been summer fallowed. It will also be somewhat richer than when the rye was sown if both rye and rape are eaten off upon the land, as both these crops draw their stores largely from the atmosphere and from the subsoil.

Forty acres of rye were sown during the first week of September. It is the intention to use this also as a cleaning crop in conjunction with rape. Some of it will be cured to use as fodder if the season is suitable and a part will be put in the silo. The amount sown per acre was two and one-half bushels, and it was sown with a drill. It should be remembered, however, that this mode of cleaning land is only suitable for soils which are adapted to the successful growing of rape.

Rape for Pasturage.—As intimated in the paragraph relating to rye, forty-six acres of rape were grown after the rye, viz., twenty-six acres after rye pastured until June 10th and twenty acres after rye cut about the middle of June and put into the silo. The ground in the first instance was ploughed, commencing June 17th, and in the second commencing June 28th. The former field was sown during the last week in June and the latter during the first week in July. In the first instance the ground was sufficiently damp to bring up the rape almost at once. In one portion of the field a heavy rain which fell immediately after the seed was sown so impacted the ground that the seed was slow in coming up, and this portion of the crop never equalled the other in strength and vitality. In the second instance the weather had become so dry by the time the seed was sown that the rape only came up at first in the damp portions, although the sowing followed close upon the drilling and the precaution had been taken to roll the drills with a heavy roller immediately after the sowing of the seed. A light shower of rain which fell three weeks later brought up the seed in the other portions of the field. This gave the crop an uneven appearance for a time, but before many weeks the rapid growth which followed soon obliterated all indications of unevenness.

A third plot was sown still later. It consisted of eight acres. This field was being fitted up for experimental purposes. It sustained a rank growth of thistles. These were permitted to grow until they were beginning to blossom. They were then turned under, the ground harrowed and drilled, and sown to rape July 31st. This field had received a liberal coating of manure before the ploughing, in view of the experimental crops to be grown upon it later. The weather was very dry when this field was ploughed, worked down and sown, which was good for the destruction of the thistles but bad for the growth of the rape. It did not germinate for some weeks. A shower which fell

during the last week in August caused quick germination and rapid growth. This field soon became covered with a strong mass of green leaves, but evidently was quite inferior to the earlier sown both in the amount of nutriment furnished and in its suitability for maintaining a good condition of system in the lambs. It neither fed them so long acre for acre, nor did they gain in flesh nearly so rapidly upon it as when feeding upon the earlier sown rape. The first hard frosts had the effect of so softening the stalks that they presented an appearance that may almost be termed one of wilting.

All three fields were drilled with the double mould board plough with marker attached. The drills were not made high and were twenty-three inches apart. One pound of seed was used to the acre, and in the earlier sown field a less quantity. The variety sown was the Dwarf Essex. The horse hoes commenced work soon after the rape had shot up into the rough leaf, and they were kept going at short intervals until the leaves from the drills which bordered upon each other had met. These fields were twice gone over with the hand hoe and all weeds removed from the line of the drills. The first time of doing this hand hoeing took one day of one man for every two acres, and the second one day of one man for every three acres.

By the 10th of September these fields, especially the two first sown, presented a beautiful appearance. There was one mass of luxuriant foliage from side to side in both without either bare ground or weed in sight. In field No. 1 the drills were made up to the travelled part of the Brock road in front of the College grounds. The reasons for doing this will be understood if reference is made to the cultivation of these road sides described on page 90. It was distinctly observable that the rape was strongest on the road side, evidencing its fondness for a soil rich in the humus formed by the decaying grass roots.

In field No. 11 the ground was gang-ploughed after the fall wheat had been removed and was sown to rape broadcast at the rate of three pounds of seed to the acre. This also was pastured, but I would not like to say without another trial whether the return was much in excess of the outlay. Of this I have no doubt, however, that if a meadow, which is in any event to be broken up, be ploughed just after the crop is removed and sown broadcast with rape that the land will be much better employed than if engaged in perfecting ragweed.

The fifty-four acres of rape in fields Nos. 16, 1 and 17 afforded a very large amount of pasture. On September 15th 18 head of steers, two and three years old, were put upon a portion of the rape and were given food from no other source until November 5th, a period of fifty-one days. They were only allowed to remain on it for an hour or two at a time at first, and ultimately as long as they cared to remain except at night when they were driven off to an adjoining pasture. They were not stabled until November 5th as the autumn was mild. They were then put in at night and allowed to pasture on the rape during the day until November 21st, which would be about equivalent to eight more full days' pasturage upon the rape. On October 4th 344 sheep were put upon the rape and remained on until 1st December, or for fifty-seven days. On October 18th 145 more sheep were put upon the rape and remained on it until 1st December, or for forty-three days. On October 23rd 100 of the lambs were shorn and were then only allowed on the rape during the day and in fair weather for thirty-seven days. If we assume that the pasture of these lambs after shearing would cover seventeen full days we must then deduct the pasture of 100 lambs for twenty days in making the final computation of the amount of pasture furnished. Now on the supposition that one steer requires as much as eight lambs, since they were all large animals, we get the following as the amount of pasture furnished by the rape. Very much to our regret what would cover fully seven acres of the ground was uneaten when the winter came, but as stated before, through no neglect of ours. The statement stands thus :—

Pasture of	18	steers	for 59	days	equal to the pasture of one lamb for	8,496	days.
"	344	lambs	for 57	"	" " " "	19,608	"
"	145	sheep	for 43	"	" " " "	6,235	"
						32,215	"
Less pasture of 100 lambs for 20 days or of one lamb for						2,000	"
						30,215	"

This is equivalent to saying that the forty-seven acres of rape eaten bare, kept 503 lambs for an average of sixty days or two months. Each acre of the rape, therefore, pastured nearly eleven lambs for two months. The lambs, however, received a small grain ration of oats per day for a little more than half the time they were on the rape. This was during the latter portion of the time and the quantity used did not exceed one-half pint per day. The above computation does not take into account the time when odd lambs were lost by death and for which no deduction of pasturage is made.

Sugar Beets.—One acre was measured off in field No. 5, and prepared for growing sugar beets as early in the spring as the season would permit this work to be done properly. We did not know last autumn that we in common with a number of the farmers in many parts of Ontario would be asked to grow sugar beets this year, with a view to ascertain the capabilities of the country in this respect, or we would have prepared the ground differently.

The aspect of the plot chosen was high, near the summit of one of the largest swells on the farm. The soil was a loam, rather gravelly in texture, and it lies on a subsoil of gravel, rather near the surface to favor the retention of moisture in a dry time. The manure on hand was not sufficiently decomposed for the purpose, and was not applied until the spring. Lower land, a milder loam, and a subsoil farther from the surface would have been more suitable, as would also the autumn application of farm-yard manure. At the late hour, however, at which it was determined to try the experiment, the most available location was chosen, weather and all other influences considered.

The land was ploughed in the fall and again in the spring. It was then harrowed and drilled, the drills being made 18 inches apart, or as near to this distance as the work could be done with the ploughs which were available. The seed was sown as directed by those engaged in promoting the industry at the rate of 16 pounds per acre. The plot was horse hoed four times, hand hoed once, and gone over again later to completely remove all weeds.

The cutworm so far preyed upon the crop that the blank spaces in the drills would comprise from one-third to one-fourth of the whole. A dry spell in August further checked the growth of the crop, as also that of the mangel crop adjoining, insomuch that the latter only gave a return of 300 bushels, or 9 tons per acre.

The harvesting commenced October 4th. The entire crop was weighed, a portion of it washed and trimmed, that is, freed from the rootlets and earth, and, from the results, the estimate for the whole was made. These results were as follows :—

Total weight of uncleaned and untrimmed roots..20,504 lbs., or 10.252 tons.
Total weight cleaned and trimmed.....19,073 lbs., or 9.536 tons.
Loss in weight in the washing and trimming, nearly 7 per cent.

The average per cent. of sugar obtained by actual chemical analysis from samples taken from all portions of the field was 15.08.

The value of the crop at $4.25 per ton for the beets when delivered at the factory would be $40.52. The price mentioned is the value per ton, which the promoters of the industry propose to pay for beets of this quality when delivered. This sum varies with the percentage of sugar which the crop yields.

The value of the mangel crop grown side by side with the beets, if put at 8 cents per bushel in the root cellar was $24.00 per acre, leaving a margin of $16.52 cents in favor of the beets, less the difference in the outlay for labor. This difference is mainly one arising from the longer time required in hand-hoeing and thinning the sugar beets, and also in handling them when taken up. It should not be more than $5.00 per acre. The yield of turnips per acre in the same field was 440 bushels, which at 8 cents per bushel would be worth $35.20. On the same basis of computation as that used in comparing the mangel crop with that of the sugar beets this turnip crop would be worth about the same as the beet crop. The yield of the three crops was very low, much lower than the average, but it is surely my duty to state, with equal candor, the failures as well as the successes of our work on this farm.

The yield of the outside row of the plot furnishes material for careful reflection. It bordered upon an open space about three feet in width, where the cultivation was deeper than that given the ground between the drills of the beets. This row yielded at the rate of about 20 tons per acre, and the percentage of sugar realized was 11.04. The large yield of this row as compared with the rest of the plot was probably caused by the deeper cultivation on one side of it. If this view is correct, it is evident that if the rows are to be not more than 16 to 18 inches apart, our cultivators at present in use are not well adapted to the purpose.

About the 1st of July an intruder appeared in the form of a grub, which preyed upon the leaves without disturbing either of the outer surfaces. It caused some of the leaves to appear somewhat blighted in a portion of their length, and no doubt injured the growth of the roots. The blighted appearance of the leaves continued for several weeks.

As this question is to the fore at present, and as the cultivation of sugar beets is as yet but little understood in this country, it may not be amiss to append some observations in reference to the methods adopted in growing sugar beets.

The most favorable climates in the world for the growth of sugar beets are such as may be denominated " wine climates," and which are therefore a shade milder than those of the larger portions of Ontario. The important requisites as to climate are moderate temperatures, with a sufficiency of moisture during the germinating period, followed by a season of warmth and moisture such as we usually possess in the months of May and June. As the season advances weather rather dry and sunny is desirable, such as we usually have in August and September. It is during this latter period that saccharification is most rapid in the roots. It cannot be said, therefore, that our climate is the very best in the world for the growth of the sugar beet. That it is well adapted, however, to produce sugar beets both in sufficient quantities to the acre, and with a sufficiently high yield of sugar, has been set at rest by the actual trials conducted in the province during the year. No less than 240 samples of seed were last spring distributed through nearly all parts of the province by the promoters of the industry to enable the farmers to conduct these trials. From the beets thus grown no fewer than 117 samples were collected and analyzed at this college by Prof. James, M.A. and Wilfred Skaife, B.A. Sc., of Montreal. The average percentage of sugar obtained was 13.58, which is higher than the average obtained from beets grown in several of the states of the American union most favorable to the industry, and is quite equal to the averages obtained in France and Germany. It may be proper also to mention that the diffusion of more knowledge regarding the methods of cultivation would secure a still higher percentage of sugar. In the analysis referred to above, the respective averages of sugar obtained from the upper or uncovered portion of well grown beets, and the lower portion were 15.5 and 16.6 per cent., and with those poorly grown, 11.4 and 13.6 per cent. The percentages of purity in the first instance were 82.7 and 83.0, and in the second 69.9 and 77.2.

In respect to the comparative yields per acre the statements are conflicting, and in nearly all of them the estimates are probably too high, as in almost every instance they are based upon the figures obtained from the growth of a single row or of a very small plot, which will give results too high for average acre plots, as will be manifest from what has been said in reference to the outside row of our own plot, and to which special reference has already been made. Nearly all the estimated average yields are over 20 tons per acre, which is manifestly too high. It is possible, however, that it may yet be demonstrated that good cultivation will give an average of 15 tons per acre, which would be quite as high as the averages of the foremost of the continental beet growing countries.

The most suitable soils are those possessing a mild, moist loam, deep and easy of cultivation. Where a stratum of loam marl is found lying underneath them, and lower still a subsoil of sand, the conditions are considered very favorable. Such soils have an absorptive power in a very marked degree. Depth of soil is absolutely necessary to success, as the beet roots take their nourishment very largely from the lower portions of the surface soil. A porous subsoil is also essential, as unless the ground drains readily

of itself or is thoroughly underdrained the soil remains too cold in the early part of the season, and capillarity is too much checked at a later period. Of clay soils those only which are mild and loamy answer well. Strong clays are not good and the same may be said of sandy soils unless those which may be denominated loamy sands.

The soils must be rich in themselves or they will require to be heavily manured. The sugar beet does not possess the power in a marked degree of gathering food from the soil, hence if the latter is not rich it is not likely to succeed.

Barn-yard manures should be applied in the fall, as when put on in the spring they induce too large a growth of leaf and this retards the ripening process. Manures that are highly nitrogenous produce a similar result. Manure made from horses is best, and that from sheep is the least useful, as its presence increases the amount of salts in the beets.

It is considered good practice to use artificial fertilizers in conjunction with barn-yard manures. When the former are used prominence should be given to those rich in phosphoric acid. When thus applied about 10 tons of fairly well decomposed farm-yard manure may be applied per acre in the autumn, and in the spring 80 to 100 lbs. super-phosphate of lime and 80 to 100 lbs. Chili saltpetre. When the barn-yard manure is used alone, or when the commercial fertilizers just named only are used, the respective amounts may be doubled. Farm-yard manure should not be applied oftener than once in five years. When farm-yard manure is not to be had and nitrogen is wanted, it may be applied in the form of nitrate of soda, and in quantities varying from 100 to 150 pounds per acre. When potash is required it may be applied in the form of kainite, and at the rate of 200 to 400 lbs. per acre. The quantities will, of course, vary to suit the requirements of each particular case.

The cultivation is similar in many respects to that required for mangels. It is imperative that the ground be deeply ploughed in the autumn. Beets will not push their way down into a hard soil, and the portion grown above ground is comparatively useless. The sowing should be early, as soon indeed as the ground is in fine condition. There is difficulty in making the drills close enough with our ordinary ploughs and the cultivators now in use cannot get down deeply enough between the drills. It is probable that it will be found here, as in France, that the proper way will be to drill on the level, with a drill that will sow several rows at once and to cultivate with a two-horse cultivator that will also cultivate several rows at once. The cultivating had better commence soon after the rough leaf is well developed and the more frequently it can be done the better are the results likely to be. The thinning and first hand-hoeing should be done just after the first cultivating. The plants are to be left about 8 inches apart in the row. The last cultivating should be done by an implement made for the purpose, which draws the earth around the plants so that the exposed portion of the roots is covered. The lifting is done by an instrument made for the purpose, which is drawn by horses.

The largest roots that may be grown are usually lower in the percentage of sugar which they yield than smaller ones. The medium sized beet weighing from 1 to $1\frac{1}{2}$ or $1\frac{3}{4}$ pounds, which is regularly formed and tapering, usually gives the best results. When grown in rows wide apart and with wide distances in the row they attain too large a size to yield a high percentage of sugar. When thinned to the distance of eight inches in the row, when the rows are 18 inches apart, the yield would be $21\frac{1}{2}$ tons, providing the beets averaged 1 pound each. It is difficult, however, to grow a field without some blanks, which will reduce the yield proportionately.

The estimates for the cost of production per acre varied, but few of them, however, exceeded $35.00, and most of them were under this sum. They include the rental of land, and the cost of the proportion of the manure used by the crop. I incline to the opinion that this estimate is too low, where all the labor of men and teams is to be hired if the drawing to the factory is also included.

The Season and the Crops.

The early part of the season was unusually wet as has been already intimated. In the amount of the rainfall until about July 20th it is probably without precedent during recent years. A first result of this was the great difficulty in carrying on field

operations, a second was the submerging of the grain in some parts, but in this respect we did not suffer very much, a third was the tendency in the ground to impact when dry weather came at length, and a fourth was the difficulty in removing weeds from amongst the grain, owing to its constantly wet condition.

The adverse influences of the weather, however, told most severely on the filling of the grain. The growth of straw was most luxuriant, and almost up to the time of ripening the casual observer would have looked for an extraordinary yield. This remark applies to all kinds of grain grown upon the farm and in all the grain fields. The weather of the ripening period was warm, but not perhaps more than ordinarily so. But the straw was unusually succulent, and when the ripening stage was reached the straight upright lean look of the heads told its own tale before the binder was set to work at all.

There was some rust, more or less of it indeed on nearly all the grain, but not nearly so much as during the preceding year. And yet the shortage in the grain, except in the experimental plots, was much more acre per acre than during the previous year. By referring to the report of the farm foreman we find 12½ acres of barley in field No. 3 yielding 19½ bus. per acre. In field No. 7 the crop of oats from twenty acres was 17 bus. per acre, where 50 bus. per acre might justly have been looked for before the earing out period. In field No. 11 the yield of Egyptian oats was 16 bus. per acre, with straw sufficient for 70 bus., and the 13 acres of fall wheat, which by the straw indications should have yielded 25 bus. per acre gave an actual return of less than 7 bus. per acre. The straw was not lodged to any great extent, and this fact renders the poor yield all the more remarkable.

It is not pleasant to state these facts, but they are unfortunately too true and will go far to explain why large quantities of grain have to be purchased to keep the heavy stock going which it is necessary for educational and other reasons to keep upon the farm. It will also serve to show in one sense at least the difficulty which is encountered in so managing the farm that the balance sheet will be on the right side.

The hay and pea crops were all that could be desired. The potato crop suffered the most from the wet, and mainly from lack of under drainage. The rape crop and root crops were on the whole very good, although the mangels and turnips were both, comparatively speaking, small crops.

The exceedingly wet weather in the later autumn again retarded operations in the fields and on the roads most seriously, but notwithstanding when winter came the autumn work was well advanced.

The Experimental Work of 1890.

This work may be spoken of under two heads, viz., Field Experiments and Live Stock Experiments. These were conducted on a scale far in advance of anything hitherto attempted here, if we consider the character and extent of the work. The same difficulties were encountered this year again which have been emphasized in previous reports. These relate to sudden variations in soil and subsoil, low aspect of the land and rust, and these conditions have been further intensified during the last two years by undue moisture during the growing period.

We hope for better things, however, in future. During the past season field No 18, northward from the grapery was fitted up for the reception of the grain plots. It is one of the most elevated fields upon the farm and one of the most uniform in the character of both soil and subsoil. We hope by this change to be able to keep rust influences somewhat at bay and to get better yields of grain. This field was manured in the early part of the season, and rape was then cultivated upon it to make it clean.

Field Experiments.

These experiments include the following :—

1. 54 varieties of barley including 69 plots ; 54 varieties of spring wheat including 54 plots ; 92 varieties of oats including 103 plots ; 27 varieties of peas including 27 plots ; and 53 varieties of fall wheat including 55 plots. Some of these varieties were failures as was to be expected, and are not reported upon. (For further particulars see pages 101 and 155).

2. The testing of oats, wheat and barley, sown at different dates to ascertain the extent of the advantages of early sowing. (See pages 101 and 154).

3. The testing of different quantities of seed in growing barley, to ascertain the relative merits of thick and thin sowing. For several reasons this experiment was not deemed sufficiently satisfactory to report upon this year.

4. The growing of 11 varieties of carrots, 29 varieties of mangels and 48 of turnips, to ascertain their relative value for feeding purposes, quantity and quality considered. (See pages 112 and 174).

5. The growing of some 28 varieties of potatoes, to determine their profitableness relatively. (See pages 112 and 173).

6. The growing of a large number of plots of rape which include several experiments. These relate to the advantages of thick and thin sowing, broadcasting or in drills and cultivation in drills or on the level. (See pages 113 and 178).

7. The growing of different varieties of millet, which were tested both with and without fertilisers. The objects sought were the determining of the relative value of the millets, and also of the fertilisers. The low location of the plots, which of necessity had to be chosen for this experiment, in connection with the wetness of the season, rendered the experiment of no practical value.

8. The growing of 12 plots of grasses which include as many varieties, and which have been laid down for eight years. The object is to test their permanency. (See page 181).

9. The growing of a number of plots of mixed grasses and clovers which were sown in 1883, 1884, 1886 and 1887 respectively, with the view also of testing their permanency. (See page 181).

10. The growing of several plots of various grasses of spring and fall seeding, to ascertain the relative advantage or disadvantage from sowing such grasses at these seasons respectively. (See page 182).

11. The growing of several plots of lucerne sown in various ways, as in drills and broadcast, to ascertain if cultivation will repay the labor and also to determine the proper quantities of seed to sow.

12. The growing of a number of plots of corn, both broadcast and in drills, with different quantities of seed, to ascertain the relative values of these respective modes of cultivation. (See page 185).

13. The conducting of tests with artificial fertilisers in growing oats and rape respectively. The object here was to ascertain the intrinsic value of these fertilisers, and in the case of the oats to ascertain their value as compared with barnyard manure. (See pages 184, 179).

14. The growing of an acre of sugar beets to ascertain the yield per acre, and the percentage of sugar that may be obtained from beets grown on soil similar to that of this farm. (See page 196).

15. The growing of tares to ascertain (*a*) the yield, (*b*) whether this crop can be grown with material advantage here, and (*c*) whether it can be so grown that the tares will not prove troublesome in the crops that come after. (See page 93).

16. The growing of a number of cereals in plots varying from $\frac{1}{8}$ of an acre to 5 acres. These include nearly fifty different varieties of grain. About 50 acres were devoted to grain experiments in plots of one acre and less, and fully one hundred acres of the crop grown was for experimental purposes. The objects in view were (*a*) to confirm the accuracy of the small tests with the more important kinds of grain, (*b*) to secure larger amounts of seeds from the more valuable sorts, and (*c*) to increase the revenue derived from the farm by devoting much of it to uses so important.

The labor arising from the extension of this work is very considerable, and in part accounts for the large outlay in conducting the work of the farm. The plots require first to be measured. Great care is necessary in sowing them. The separating borders require to be kept clean throughout the season. The labor of harvesting is tedious. The threshing which is done in the open air is also a labored work, as the machine requires to be thoroughly cleaned after each plot has been threshed. The same applies to the winnowing of the grain. (For further particulars see pp. 155).

The report of Mr. Zavitz on the plots of spring grains grown in the experimental department, commencing with page 152, furnishes a very complete summary of the work done in this line. The following bulletin, issued on the subject about the end of the year, brings out the points which are of most vital importance to the farmer :—

Bulletin LVIII.

Experiments with Spring Grains in 1890.

The tendency with every variety of grain that has ever been produced is to deteriorate when grown long upon the same kind of soil and in the same locality. The necessity, therefore, for the introduction of varieties from other countries or from distant parts of the same country, and of producing varieties which are entirely new, will always exist. In this fact we find a perpetual argument for the existence of experimental farms.

The object of this bulletin is to make known to our farmers (1) the varieties of spring grains which grew most successfully at this farm during the summer of 1890 ; and (2) important comparisons relating to all the varieties grown. These comparisons relate (1) to yield, weight of grain, weight of straw, and date of maturing in all the varieties mentioned ; (2) to color, and other peculiarities of growth, to the structure and weight of the grains, to the relative percentage of the hull, and to proneness to injury from rust in some of the varieties named ; (3) to the number of varieties tested from different countries and the average yields obtained from them, and (4) to six-rowed and two-rowed barleys respectively, with and without hulls.

The information thus given has been obtained from tests made with 54 varieties of barley, 54 varieties of spring wheat, 20 varieties of pease, and 92 varieties of oats. The different varieties of each kind of grain were grown under similar conditions as to soil and treatment. They were sown side by side upon plots containing one-fiftieth of an acre each in the case of the barleys, one-sixtieth of an acre in that of the pease, and one one-hundredth of an acre in that of the spring wheat and oats. In the tables given below the yields are based upon the standard weights obtained from the measured bushel, and from samples that were thoroughly cleaned.

Barley.—The information given in Table I. relates to the ten varieties of barley which gave the highest yields in 1889 and 1890. The average yield is given for the two years. The varieties grown in 1889 were sown April 15th, and those grown in 1890 April 19th.

TABLE I.

Name of variety.	Kind.	Country whence obtained.	Yield per acre.	Weight of grain per bushel.	Weight of straw per acre.	Number of grains per ounce.	Date of maturing.
			bush.	lbs.	tons.		
Cheyne	2-rowed	Germany	48.5	53½	2.18	670	6th August.
Chevalier	"	France	47.5	52⅓	1.13	726	7th "
Mandschurei	6-rowed	Russia	47.3	51¼	1.70	755	31st July.
Oderbrucher	"	Germany	45.8	54¼	1.42	743	1st August.
Empress	2-rowed	England	45.4	51¼	1.92	720	6th "
Early Black	6-rowed	France	44.8	51	1.61	591	31st July.
Scotch Improved	"	Ontario	44.4	52	1.27	805	31st "
Selected Chevalier	2-rowed	England	43.0	50½	1.75	758	7th August.
Common	6-rowed	Ontario	41.7	54½	1.29	819	31st July.
Golden Drop	2-rowed	Germany	41.4	53½	1.84	646	5th August.

In addition to these the following varieties went over 40 bushels per acre, viz.: Hallett's Pedigree (Germany), Italian Rice (Germany), and Imperial (France). Carter's Prize Prolific is not included in the above list as with us the average yield for the two years was 32.3 bushels per acre on the small plots, and the return this year for the acre plot was 31½ bushels, and the weight of the crop of 1890 was 52 pounds per bushel. It appears, however, to have done much better in many other localities.

SPRING WHEAT.—The information given in Table II. relates to seven varieties of spring wheat which gave the highest yields in 1890. They were sown April 25th.

TABLE II.

Name of variety.	Country whence obtained.	Yield per acre.	Weight of grain per bushel.	Weight of straw per acre.	Rust tendency.	Date of maturing.
		bush.	lbs.	tons.		
Herison Bearded	France	27.2	64	1.90	Very slight	8th August.
White Fyfe	Ontario	26.9	60	1.39	Considerable	14th "
Bart's Trimenia	Greece	26.3	64	1.06	Very slight	10th "
White Russian	Ontario	22.1	57¼	1.91	Considerable	11th "
Red Fern	Ontario	21.9	60	1.76	Slight	11th "
Pringle's Champion	Germany	21.2	59½	1.90	Very slight	12th "
Holben's Improved	Germany	20.4	58½	1.70	Medium	14th "

The Herison Bearded has been tested for two years, and was last year ahead of all the foreign varieties, and also of all the Canadian varieties except the Wild Goose. It is a fairly strong grower, stands up well, and is almost entirely free from rust. The head is short but compact and is bearded; the chaff is red and the berry is rather small but plump, and is also red.

The Bart Trimenia, though a good yielder and weighs well, is rather coarse in the berry.

PEASE.—The information given in Table III. relates to five varieties of pease which gave the highest yields in 1890. They were sown April 24th.

TABLE III.

Name of variety.	Country whence obtained.	Yield per acre.	Weight per bushel.	Weight of straw per acre.	Date of maturing.
		bush.	lbs.	tons.	
Sweet Jessie	England	31.16	62¾	0.82	11th August.
Early Race-horse	"	29.29	64¼	1.06	10th "
Mummy	Ontario	28.60	65⅝	1.26	11th "
Early Britain	England	28.37	60	0.57	11th "
White Wonder	New Zealand	27.67	64¾	0.80	5th "

OATS.—The information given in Table IV. relates to the ten varieties of oats which gave the highest yields for 1889 and 1890. The average yields are given for the two years. They were sown on April 22nd of each year.

TABLE IV.

Name of variety.	Country whence obtained.	Yield per acre.	Weight of grain per bushel.	Yield of straw per acre.	Tendency to rust.	Character of head.	Color of grain.	Number of grains per grain.	Percentage of hull.	Date of maturing.
		bus.	lbs.	tons						
Joanette Black	France	71.7	34½	2.7	Slight	Spreading	Pale black.	51	27.0	9th July.
Houdan Black	"	69.1	34¾	2.0	Slight to medium.	"	"	66	28.9	9th "
Chenailles	"	69.1	34⅝	2.9	Slight	"	Black	55	26.0	8th "
Oderbrucher	Germany	66.6	31½	2.3	"	"	White	41	33.5	6th "
Danebrog	"	64.0	32	2.7	"	"	"	41½	30.0	9th "
Siberian	France	63.6	34¾	2.1	Medium to slight.	"	"	51	30.0	2nd "
Black Etampes	"	62.3	36½	2.5	Slight	"	Black	41	26.8	9th "
Probsteier	Germany	61.8	33	2.6	Slight to medium.	"	White	44	30.8	6th "
Pringle's Progress	Ontario	61.8	28½	2.7	Slight	"	"	39	35.0	4th "
Improved Besthorne	Germany	61.8	32¼	1.9	Considerable	"	Yellow	45	30.6	9th "

It will be observed that all but one of these best varieties are foreign, although 21 varieties of Canadian oats were grown, including nearly all the old standard varieties. The average yield of the ten varieties given in the table was 64.1 bushels per acre,

while the average yield of the ten poorest was 27.8 bushels, that is, the ten good varieties yielded 230 per cent. more than the ten poor ones. It is also worthy of note that these good varieties all possess the spreading head.

The Joanette Black, Houdan Black, Chenailles and Black Etampes are very much alike in all essential characteristics. The straw is strong and of medium height, or a little less. It stands exceptionally well, is not coarse, and is almost entirely free from rust. They are somewhat inclined to shell easily when ripe, as is often the case with valuable grains. They also yield well and weigh well, and have a small percentage of hull as compared with the kernel.

Average Yields of Barleys.

The average yields of barleys grown from seed obtained in the five countries named are as follows :—

Germany	17	varieties	Yield per acre,	35.6	bushels.
England	13	"	"	42.2	"
France	7	"	"	37.6	"
Ontario	4	"	"	38.2	"
Sweden	4	"	"	33.5	"

Average Yields of Oats.

The average yields of oats grown from seed obtained in the seven countries named are given below :—

Ontario	21	varieties	Yield per acre,	35.6	bushels.
France	19	"	"	47.8	"
Germany	15	"	"	48.0	"
Scotland	13	"	"	41.8	"
England	9	"	"	41.8	"
Russia	5	"	"	42.7	"
Australia	4	"	"	32.6	"

Two-rowed and Six-rowed Barley.

Table No. 5 gives information regarding the 54 varieties of barley grown with and without hulls as to yields, weight of grain per bushel, and the size of the grains.

Table V.

Character of head.	With or without hulls.	Number of varieties.	Average yield of grain per acre per bushel.	Average weight of grain per bushel.	Number of grains per ounce.
Six-rowed	With hulls	9	37.45	51.22	772.2
	Without hulls	5	31.00	61.80	848.2
Two-rowed	With hulls	39	37.84	51.87	685.1
	Without hulls	1	21.90	63.00	478.0

It should be borne in mind (1) that the average yields obtained in growing these grains is more than the average is likely to prove in the country generally, for they were all grown under very favorable conditions. (2) That similar weights are not likely to be realized unless the grains are thoroughly cleaned, and (3) that the facts in this bulletin will be valuable mainly in localities with soil and climatic conditions similar to those here. The soil where these plots were grown may be termed a mild clay loam, containing a considerable quantity of humus, and it is somewhat low in aspect. The average mean temperature for the past four years for the five months commencing with May 1st, has been 61°, 43′, F.

Conclusions.—The following conclusions may safely be drawn from the experiments which have been summarized as above :—

(1) It is highly probable that some of the foreign varieties of barley named in the table will be found to give higher yields than the varieties now grown in Ontario when they shall become more generally introduced.

(2) It is probable that in some localities the Herison bearded spring wheat will be found to be an improvement on many of the varieties that are now grown.

(3) From present indications based upon the trial given in the table and upon a trial on a larger scale upon the farm, the Mummy pea is likely to become a generally useful variety, although the straw is not highly valued for feeding purposes, owing to its coarse habit of growth.

(4) That four varieties of French oats, viz., the Joanette Black, the Houdan Black, the Chenailles and the Black Etampes are likely to prove of much value to the farmers of this province, as they possess in common and in a marked degree nearly all the most valuable characteristics of oats. Their color will, however, discount them in the estimation of the oatmeal millers. The behavior of the Oderbrucher, also a white variety from Germany, has been such as to entitle it to the favorable consideration of the farmers. It has been most favorably recommended by the oatmeal millers.

(5) Judging from the experience of the past two years, the English barleys give on the whole the best results, but some fair growing and yielding varieties come from Germany and France. In reference to oats, the French varieties should be placed first, all things considered, although some kinds from Germany do nearly as well.

(6) The average yields obtained from the two-rowed and six-rowed varieties of barley are not far different, nor is there much difference in the average weights of the two classes.

(7) The average returns from the foreign varieties are in a majority of instances superior to those from the old standard varieties.

Additional Notes Regarding Spring Cereal Grains.

Average Yields of Barleys.—A complete list of the average yield of barleys for 1890 and the countries which furnished them is given below :—

Germany	17	varieties	Yield per acre,	35.6 bushels
England	13	"	"	42.2 "
France	7	"	"	37.6 "
Ontario	4	"	"	38.2 "
Sweden	4	"	"	33.5 "
New Zealand	2	"	"	47.8 "
Russia	2	"	"	33.9 "
Scotland	2	"	"	29.1 "
Australia	1	"	"	8.9 "
Italy	1	"	"	38.8 "
Hungary	1	"	"	51.0 "

One of the New Zealand varieties gave a yield of 44.3 bushels per acre. It is the thirteenth in the order of yield. The weight per bushel was 54.62 lbs. It was one of the finest samples grown.

The Early Black, one of the ten best yielding varieties, was badly affected with smut during both years of its growth.

While the average yield per acre of the five best varieties of barley grown was 46.9 bushels per acre, that of the five poorest varieties was only 23.6 bushels.

Barleys Grown in Large Plots.—Amongst those were the common Ontario and Carter's Prize Prolific, which were grown in acre plots, and the yields from them, were as follows :—

Common Ontario, 39 bushels per acre.

Carter's Prize Prolific, 31½ bushels per acre. (See page 170.)

Average Yields of Oats.—This enumeration gives a complete summary of the varieties of oats grown from the different countries and the comparative yields obtained from them :—

Ontario	21	varieties	Yield per acre,	44.8	bushels.
France	19	"	"	47.8	"
Germany	15	"	"	48.0	"
Scotland	13	"	"	41.8	"
England	9	"	"	41.8	"
Russia	5	"	"	42.7	"
Australia	4	"	"	32.6	"
Sweden	1	"	"	39.0	"
Hungary	1	"	"	39.7	"
California	1	"	"	42.7	"

White and Black Oats Compared.—This table gives the particulars of comparison between the white and black oats grown in these experiments in the most important essentials :—

Color of grain.	No. of varieties.	Average period of maturing.	Rust tendency.	Percentage of hull.	No. of grains per grain.	Yield of straw per acre.	Aveage weight of grain.	Average yield per acre.
						tons.	lbs.	bus.
White	22	7th July.	2.32	35.32	39.06	2.30	34.92	43.25
Black	70	10th July.	2.26	34.70	51.38	2.60	31.66	45.59
Mean averages	92		2.28	35.06	49.59	2.37	34.14	43.82

The most marked difference is in the size of the grains, in which the white varieties have the advantage. In this table and the following the number 10 is used to denote the maximum of rust tendency.

Mane oats and the spreading varieties compared.—This table gives the particulars of comparison between the varieties of oats grown with the head on one side and those with the spreading head :

——	No. of varieties.	Agerage yield per acre.	Average weight per bush.	Rust tendency.
		bush.	lbs.	
Mane Oats	20	46.30	32.34	2.75
Spreading variety	72	43.02	34.66	2.16

The opinion is somewhat widespread that the Mane varities are the best yielders, and the results given in this table certainly tend to justify that idea, but it should be borne in mind that in the table containing the best ten yielding varieties, they all possess the spreading head. The Mane oats seem decidedly more prone to rust.

Oats grown upon large plots.—Thirteen varieties of oats were grown in plots varying from one-third of an acre in size to one acre. The highest yields were as follows :—

White Poland ..... 49.2 bushels per acre.
Black Etampes ..... 47.1 " "
American Banner ..... 45.4 " "

For full particulars see the report on page 171.

Barley sown at different dates.—This table gives the results from sowing barley in duplicate plots at three different periods :

Dates of sowing.	Average yield per acre.	Agerage weight per bushel.	Average weight of straw per acre.
	bush.	lbs.	Tons.
May 1	37.3	49.88	1.02
May 9	31.2	46.25	1.04
May 17	18.0	41.88	.77

Spring Wheat sown at different dates.—This table gives the results from sowing spring wheat at different periods :

Dates of sowing.	Yield per acre.	Weight per bushel.	Weight of straw per acre.
	bush.	lbs.	Tons.
May 1	10.65	57.4	1.35
May 9	6.26	56.5	1.15
May 17	5.04	56.0	1.04

Oats sown at different dates.—This table gives the results from sowing oats in duplicate plots at different periods :

Dates of sowing.	Average yield per acre.	Agerage weight per bushel.	Average weight of straw per acre.
	bush.	lbs.	Tons.
May 1	30.9	30.5	2.07
May 9	25.0	24.5	1.73
May 17	19.1	21.5	1.66

These experiments with sowing three varieties of grain at different periods emphasize the importance of sowing grain at the earliest possible moment in the spring after the ground becomes dry. It would have added much to the value of the experiments if the first sowing had been earlier, but the wet condition of the ground put aside for the purpose rendered this impossible.

WINTER WHEAT EXPERIMENTS.

These experiments, the full details of which are given on pages 164, 165 were summarized in the bulletin, given below, which appeared before the sowing of the winter wheat crop :—

Bulletin LIII.

Winter Wheat Experiments of 1890.

It is the natural tendency with all cereal grains to deteriorate when grown long in one locality without change, the full reasons for which have never yet been given to the world. Because of this the necessity arises for a change of seed, and ultimately for the introduction of new varieties. In selecting the most suitable of these for his locality the farmer frequently finds difficulty. This arises in part from the unreliable nature of the information not unfrequently given by those who introduce these new varieties, and in part from the absence of information that would enable the purchaser to compare the merits of these with those of standard varieties. With a view to give such information this bulletin—the first issued on growing winter wheats on this farm—has been prepared, and it is hoped that it will reach the farmers in time to serve the intended end.

From the information given in the subjoined table, the farmer who understands the nature of his soil can readily decide as to which of the kinds thus compared, are most likely to give satisfactory results when grown on his land. If his soil does not naturally produce a stiff straw, he can reject all varieties that are weak in this respect. If it requires strong growing varieties, he knows which possess these qualities ; and if rust is practically unknown in his locality, as is sometimes the case, he need not of necessity reject those most inclined to rust, as they may possess other qualities of much value.

Fifty-two varieties in all have been tested on the farm during the present year, of which twenty-one are Canadian and thirty-one foreign. Of the foreign varieties, fifteen samples came from England, eight from France, five from Germany, one from Russia and one from Scotland. Some of these varieties stood the winter well, and possess much promise for the future. Full particulars will be given regarding them in the next annual report.

Of the eighteen Canadian varieties contained in the subjoined table, some are old standard sorts, grown with the object of rendering more valuable the comparisons of the new varieties. The tests were made on plots of one-hundredth of an acre each, in a soil which may be termed a clay loam, but somewhat sandy in its texture. It possessed a decided slope to the south-west, and was therefore fully exposed to the sweep of cold winds while the ground was bare so much of the time last winter.

The following is a list of the Canadian varieties, with the most important particulars regarding their growth and behavior :

Varieties.	Matured, July.	Chaff.	Rust tendency.	Strength of straw.	Color of grain.	Yield per acre.		Weight of grain.
						Straw.	Grain.	
						lbs.	Bush.	lbs.
Golden Drop	25	Ba.	2	M	G	4,675	32 1-2	61 1-5
Surprise	19	Ba.	1½	S	W	5,656	29 3-5	58 2-3
Manchester	23	Ba.	5	M	A	4,825	30 2-5	61
Bonnell or Landreth	25	Ba.	1	S	W	5,025	32 1-12	61
Seneca or Clawson	25	Ba.	1	S	W	3,475	25 2-5	59
Rogers	27	Ba.	2	S	A	5,475	34 3-5	60 3-4
Hybrid Mediterranean	21	Be.	3¾	W	A	4,708	32 1-12	60 1-6
Martin Amber	27	Ba.	2	S	A	4,050	32 1-2	62 1-2
Standard	24	Ba.	3	S	W	4,250	31 7-10	59 1-3
Red Velvet Chaff	23	Ba.	2	S	R	4,950	35 4-5	61
Lancaster	20	Be.	2	W	R	6,650	33 1-3	61 2 3
Early Red Clawson	22	Ba.	2	S	R	5,025	32 1-12	58
Volunteer	19	Be.	3	M	R	6,350	36 1-4	58 1-2
Golden Cross	20	Be.	3	S	R	5,125	27 9-10	58
New Monarch	27	Ba.	3	S	R	3,756	20	56 2-3
Red Lion	23	Be.	2	S	R	4,400	29 1-6	60
Democrat	28	Be.	4	S	A	4,350	20	56 1-2
Garfield or Natural Cross	28	Ba.	2	S	W	3,300	15 4-5	57

NOTE.—The first twelve varieties were sown on 10th September, Volunteer on the 12th, Golden Cross, New Monarch and Red Lion on the 19th, Democrat on the 27th and Garfield on October 7th. The late sowing of the two varieties last named was owing to an oversight in shipping on the part of the seedsman from whom they were ordered. In the third column "Ba" denotes bald chaff, and "Be" bearded chaff. In the fourth column "1" denotes freest from rust tendency. In the fifth column, strength of straw, "M" denotes medium, "S" strong and "W" weak. In the sixth column, color of grain, "A" denotes amber, "G" golden, "R" red and "W" white. In the eighth column the yield per acre is computed from the yield of the plot, and in the ninth column the weight of grain is per measured bushel.

In regard to the foregoing it will be observed :

1. That while none of the yields are so large as on some other soils, they are all fairly good. The largest yielders per acre are the Volunteer and the Red Velvet Chaff, and the heaviest yielders per measured bushel are the Martin Amber and the Lancaster.

2. That the varieties least susceptible to rust are the Bonnell or Landreth and the Seneca or Clawson, about equal, followed by the Surprise, while those most susceptible are the Manchester and Hybrid Mediterranean, of which the test was not a fair one owing to the late period of sowing it. These varieties both rusted badly in field plots, the former in 1889 and the latter in the present year.

3. That in the opinion of competent judges the best varieties for milling purposes are the Lancaster, Red Lion and Velvet Chaff among the red wheats, and the Bonnell or Landreth among the white. This feature is very important, as no variety unsuitable for grinding will retain its place long, whatever good qualities it may otherwise possess.

4. That the best varieties for this locality, taking into consideration yield, weight, strength of straw, freedom from rust and value for milling purposes, are perhaps the Red Velvet Chaff, Lancaster, Martin Amber and Volunteer, in the order named, and probably the best single sort is the Red Velvet Chaff. It is a rather new variety, grows strong and tall and stands well, has a long and uniform head, yields well and weighs well, but is considered a trifle soft. It should be remembered however that this wheat is not the same as another variety called Canadian Velvet Chaff, a white wheat and one not yet tested by us.

5. None of the newer varieties are so decidedly superior to the older ones as to render it certain that they will become decided favorites. The safe plan will be to test them by sowing one or two bushels, which, if they do well, will provide abundant seed for another year.

Of the thirty-one foreign varieties of winter wheat sown in the autumn of 1889, no less than twelve completely succumbed to the severity of the winter. There are therefore only nineteen varieties to report from. The table below gives the particulars regarding the four varieties of foreign winter which proved themselves superior :—

Name of variety.	Country whence obtained.	Yield per acre.	Weight of grain per bushel.	Weight of straw per acre	Tendency to rust.	Date of maturing.
		Bush.	lbs.	Tons.		
Galezien Summer.....	Germany ..	32.5	62⅔	2.05	Very slight....	25th July.
White Square Head	Germany ..	32.08	57½	2.22	Considerable...	30th "
Russian Odessa..	Russia.....	28.33	60⅔	2.05	Considerable...	30th "
Lamed Hybrid.....	France	26.25	59	1.79	Considerable...	30th "

The Galezien Summer stood up perfectly, and was almost entirely free from rust. The only other variety that could be pronounced ahead of it in this respect was the Rietti from France, which killed out considerably during the winter, but yielded notwithstanding 19.13 bushels to the acre. The Galezien Summer is a bald wheat with a white chaff and a medium sized kernel of excellent quality. The return was the most satisfactory obtained from any variety grown, Canadian or foreign, if yield and weight per bushel are considered.

The One-grained Spelz fall wheat could not be considered in striking averages, as the kernel was enclosed in a hull after threshing. It requires the use of special machinery to separate the grain from the hull. It appears to be very hardy and was this year entirely free from rust. As the yield was 47.33 bushels per acre, it is quite possible that it may be found useful in time to grow for feeding.

EXPERIMENTS WITH FIELD ROOTS, POTATOES AND RAPE.

A large number of varieties of field roots were grown in rows, in most instances three rows of each variety. These rows were alongside of each other and in the same range of fairly even soil in field No. 17. There were also grown in the same range a large number of varieties of potatoes and of these three rows were grown of each variety. In fields Nos. 3 and 14, a number of rape plots were grown and in various ways. A summary of the more important results of these experiments is given in the succeeding paragraphs, which relate to each respectively :—

Field Roots.—These comprised forty-eight varieties of turnips, twenty-nine of mangels and eleven of carrots. The ground was ploughed out of sod the previous year, and was liberally manured in the spring. The sod had been skimmed with a light ploughing just after harvest and this was followed by a deep ploughing later.

Turnips.—Of these sixteen of the varieties grown were white or yellow fleshed and thirty-two were of the Swedish sorts.

Of the white and yellow varieties, the following took the lead :—

Name of variety.	Yield per acre.	Average weight of each root.	Color of flesh.
1st. Red Globe Norfolk	26.52 tons or 884 bushels.	4.60 lbs.	White.
2nd. Red Top Strap Leaf	20.68 " 689⅓ "	6.88 "	White.
3rd. Mammoth White	20.15 " 671⅔ "	6.64 "	White.

Of the Swedish varieties, the best are given in the statement below :—

Name of variety.	Yield per acre.	Average weight of each root.
1st. Carter's Elephant Swede	20.98 tons or 699⅓ bushels.	2.26 lbs.
2nd. Fetticairn	20.91 " 697 "	2.54 "
3rd. Royal Norfolk	20.19 " 673 "	2.14 "
Skirving's Purple Top Swede	12.38 " 412⅔ "	1.81 "

It should be borne in mind that these three varieties are new, or not very long introduced. The seed of the Red Top Strap Leaf came up rather sparsely or it probably would have given the best yield. Carter's prize Elephant Swede was introduced into this country by the seed firm of old London after whom it is named. It is an oblong turnip, and holds its width well down. Skirving's Purple Top Swede is an old standard variety and was introduced here solely for purposes of comparison. The comparison shows the necessity of introducing new varieties from time to time. (See page 174.)

Mangels.—Of the 29 varieties of mangels grown, those which took the lead stand in the order named :—

Name of variety.	Yield per acre.	Average weight of each root.
1st. New Giant	14.62 tons or 487⅓ bushels.	2.00 lbs.
2nd. Yellow Intermediate	14.23 " 474⅓ "	2.44 "
3rd. Pearce's Clan Giant	14.04. " 468 "	1.75 "

The Yellow Intermediate is a tried variety, hence, judging by this test we have nothing much superior. (See page 176).

Carrots—Of the 11 varieties of carrots grown, the three best yielders are mentioned :—

Name of variety.	Color.	Yield per acre.	Average weight of root.	Average length of root.
1st. White Vosges or Giant Short.	White.	17.78 tons or 592⅔ bus.	.85 lbs.	10 inches.
2nd. Mitchel's Perfected	Deep Orange.	17.02 " 567⅓ "	.59 "	9⅓ "
3rd. White Belgian	White.	16.64 " 554⅔ "	.67 "	12½ "

The White Belgian is a standard variety, so that in this instance we have an excellent standard of comparison. The White Vosges took a decided lead last year. It is of large size, a clean grower, not too long, and, therefore, easily harvested. Mitchell's Perfected is a new Canadian variety, introduced by a gentleman of St. Mary's, and it is full of promise. (See page 176).

Potatoes.—The 28 varieties of potatoes grown, which are first in point of yield, in regard to mealiness, flavor, and mealiness and flavor combined, are given in the order named below :—

Name of variety.	Yield per acre.	Early or late.	Best as to mealiness.	Best as to flavor.	Best as to mealiness and flavor.
	bushels				
Thorburn	162	Early	Clark's No. 1	Beauty of Hebron.	Beauty of Hebron.
Empire State	162	"	Daisy	Convoy	Daisy.
Daisy	157⅓	"	Convoy	Daisy	Convoy.
Early Puritan	139½	"	Beauty of Hebron	Green Mountain.	Thorburn.
Clark's No. 1	139¼	"	Thorburn	Thorburn	
Summit	137	"			
Beauty of Hebron	99	"			
Late Rose	94½	Late.			

The Beauty of Hebron and Late Rose are mentioned for the purpose of comparing yields, both being tried and standard varieties. From the comparison we must conclude that for large yields in our soil the Thorburn and Empire State stand at the head, but it will be noticed they do not rank high for table uses. Taking them all in all the Beauty of Hebron, the Daisy, and the Convoy rank highest for table use in the order named. If yield and suitability for table use are considered, the Daisy should probably get the first place. The testing of the quality was done in a somewhat practical way. Twelve potatoes of each of the varieties named were given to three different heads of departments, who were to take notes of the qualities of the potatoes when boiled with their skins on and at the time of the meal. These findings were compared, with the result which has been stated. There was much agreement between the reports. (See page 172.)

Rape grown on four kinds of soil.—A most interesting and instructive experiment was carried on with growing rape on four different kinds of soil on plots that were made. These were loam, marl, clay and muck. The plots were in duplicate and on one only of each salt had been applied with the two previous crops at the time of sowing them, and at the rate of 400 pounds per acre each year. The crop of 1889 was oats and that of 1888, barley; no salt was applied with the rape. The rape plants were equally thinned to enable them to develop well and to equalize the conditions.

The table below gives the results:

Kind of soil.	With or without Salt.	Yield per acre.	Average yield per acre.
		Tons.	Tons.
Loam	Salt	9.45	8.005
	No salt	6.56	
Marl	Salt	6.72	5.320
	No salt	3.92	
Clay	Salt	2.81	2.605
	No salt	2.40	
Muck	Salt	4.77	4.525
	No salt	4.28	

The point brought out here in reference to salt is of much significance. The salt it will be remembered was applied during the previous years. The oats of the previous year and the barley preceding that, gave the best returns where the salt was applied, and this year the difference in the yield of rape on the same plot is marked. From this we draw the conclusions (1) That salt acts beneficially on a rape crop where applied plentifully the two years preceding the growing of the rape, and (2) that it does so in a marked degree. It is also apparent from this experiment that while loam is good for growing rape, clay is of no use practically for this purpose. The results from the humus or muck-soil are not of much consequence, owing to the injury which the plots received from the wet. (See p 178.).

Rape with Fertilizers.—In this experiment rape was grown in small plots, and the different fertilizers named in the table below were applied when the plants were about one-third grown. The estimated yield of the rape was made from averaging four different plots similarly treated. These plots comprised two rows each 66 feet long,

and all in the same range. They were 22 inches apart and between each plot fertilized one row was grown without any fertilizer. The table subjoined gives a summary of the results :

Name of fertilizer.	Quantity of fertilizer applied per acre.	Yield of rape per acre.
	lbs.	Tons.
Sodium nitrate	150	10.012
Dried blood and scrap	300	9.034
Salt	300	8.685
Superphosphate	300	8.111
Unleached wood ashes	750	8.111
No fertilizer		8.044

As was to be expected the quick action of the nitrate of soda produced the most marked results. Until we ascertain more definitely the approximate value of rape per ton, we cannot draw safe conclusions as to the real value of these fertilizers in growing rape.

Rape grown in Drills and on the Level.—This experiment resulted as it did last year in favor of level culture (see Report for 1889, p. 140). The return was

From the drills..... 8,520 lbs.
From drills grown on the level..... 10,095 "

There is an important problem yet to be solved for the farmer in the relative merits of growing roots and rape on the level or in drills. It is quite possible that it may yet turn out that the former method is preferable if we only had the machinery which would enable us to sow a number of drills at once and to cultivate as large a number. It would require to be drawn by two horses. Here is an unoccupied field for the inventor. (See p. 179).

Rape thinned and not thinned.—In this experiment the rape was sown in drills. Four pounds of seed was used to the acre. In the plots thinned the distance between the plants was 15 inches. The thinning was done when the plants were about one-third grown, which was, it may be, rather late. The late sowing of the rape, about the middle of July, probably tended to reduce the relative yield of the thinned plots. The yield was

From the unthinned plots..... 27,376 lbs. per acre.
" thinned " ..... 5,505 "

These results should lead us to hesitate about using too small a quantity of seed. It may turn out as further investigation is made in this direction, that less than one pound of seed per acre as now recommended is too small an amount to sow.

LIVE STOCK EXPERIMENTS.

The experiments in live stock follow each other in a constant succession, and as frequently as room can be obtained for conducting them. While the field for live stock experiments is without limit, the facilities for conducting them with us are circumscribed, although we compare well in this respect with other institutions. While experiments in the field may only be circumscribed by the ambition of the parties controlling them and the amonnt of means and suitable land at their disposal, those with live stock are largely circumscribed by the amount of the building accommodation. Live stock experiments require relatively a large amount of room. Each animal or group of animals requires a separate apartment which must also be sufficiently commodious, otherwise the value of the experiment will be impaired. The farmers who say to us, as they not infrequently do, "Why don't you conduct this experiment or that" will please bear in mind what I have stated above. Give us the clay and the straw, and we will render unto you the full tale of bricks.

The following are the principal of the live stock experiments for the year :

1. The fattening of cattle on corn ensilage and meal; corn ensilage, hay and meal; and roots, hay and meal. The object sought was to ascertain the relative cost and suitability of these respective rations for fattening purposes. (See pages 156 and 226).

2. The fattening of lambs on rape, and subsequently on a winter ration of hay, grain and roots, to determine the value of this system of producing mutton. (See pages 118 and 189).

3. The feeding of pigs on ensilage and meal, roots and meal, and meal alone, to determine the suitability of these respective rations in producing pork, and also their relative cost. (See pages 120 and 190).

4. The feeding of pigs on a ration of peas and barley whole, on the same grains ground, and on a mixture of various kinds of meal, with the object of testing these rations intrinsically, and as pitted against each other in making pork. (See pages 122 and 192).

5. The feeding of pigs on meal alone, and meal with cut green food added in different proportions, to ascertain the proportion of green food that should be added to the meal. (See pages 125 and 193).

6. The feeding of cows in the stable on green food, to ascertain the average required to sustain a cow during the soiling season. (See pages 127 and 196).

7. The rearing of grade steers of the various breeds, embracing the Shorthorn, Hereford, Aberdeen-Poll, Galloway, Holstein, Devon, and native or scrub. The objects of this experiment include the following along with others : (1) To ascertain the comparative merits of these respective breeds for beef making purposes; (2) the relative gains at different periods of growth, and (3) the cost of production. (See pages 128 and 196).

FATTENING STEERS FOR EXPORT ON DIFFERENT RATIONS.

The opinion has hitherto extensively prevailed that beef cannot be made at a profit in winter in sections of the country where roots cannot be grown successfully. If this were true, it would then follow that this product could not be grown in large sections of this province. This experiment was undertaken with the object of ascertaining some mode of beef-making in the stall that would prove successful without the aid of roots, and if possible at no greater outlay. The results are given below in bulletin XLIX., issued May 28th, 1890.

Bulletin XLIX.—Corn Ensilage as a Food for Making Beef.

The idea that beefing animals cannot be fed at a profit has been pretty generally indulged in of late, owing to the relatively low prices obtained for some time past compared with those of former years. The experiment conducted at this institution last winter with the utmost care and precision, the details of which are given below, happily disproves the correctness of this idea.

Ten good Shorthorn grade steers, two and three years old, were purchased and brought to the farm, October 19th, 1889. The price paid for them was $500, which was a little extreme, owing to the difficulty of getting a uniform lot and for other reasons. They were sold 16th May following for shipment to Britain for $897.30, or an advance of $397.30, the price received being 5¾c. per pound live weight.

From the date of their arrival at the farm until the close of the year they did not much more than pay for the food fed them, because of the imperfect facilities for feeding, arising from the unfinished state of the new buildings.

Six of the ten, all three years past, were selected for a feeding contest which commenced 31st December, 1889, and closed 29th April, 1890, thus lasting 119 days. The primary object of the test was to ascertain the value of corn ensilage and meal for beef making as compared with (*a*) corn ensilage, hay and meal, and (*b*) roots, hay and meal he ration usually fed.

Feeding.—Group 1, comprising lots 1 and 2, were each fed an average of 79.4 lb. of ensilage per day and 12.7 lb. of meal. There was left uneaten of the ensilage 18 lb. per day of the coarser portions, but the whole amount fed was charged against the steers.

Group 2, comprising lots 3 and 4, were fed daily 41.6 lb. ensilage, 11.3 lb. hay and 12.7 lb. meal. There was left uneaten of the fodder 13½ lb. per day, which amount was also charged against the steers.

Group 3, comprising lots 5 and 6, were fed daily 14.3 lb. hay, 41.6 lb. roots and 12.7 lb. meal.

The meal consisted of equal parts by weight of pease, barley and oats, and was always mixed with the other food. The hay (clovery and not extra in quality) was cut and mixed with the other food, and the roots were pulped and mixed likewise. The food was fed in three feeds daily, and water was virtually given in the stall; everything given except bedding and water was accurately weighed.

Charges for Food, Bedding and Labor.—The food given, except roots and ensilage, was charged at the average market values in Guelph, viz: Pease 55c., barley 40c., and oats 28c. per bushel, or an average of ⅞c. per lb. for the mixture; hay $6.50 per ton, roots 8c. per bushel in the cellar, and ensilage $2.50 in the silo.

The bedding used was estimated at 15 lb. per head per day, and charged as worth $1.50 per ton in the barn.

The labor was estimated on the assumption that one attendant at $25 per month would feed and care for 40 head as ordinarily fed; that $2.50 per week would pay for the additional outlay in assisting the said laborer in cutting, grinding and pulping the food, and that the *additional* help in preparing the food in this contest be charged at half this rate, on the ground that the ensilage was already prepared.

Estimated Value of the Manure.—The manure was estimated at 75 lb. per day per head, and valued at $1.50 per ton, as the standard value of manure made from ordinary stock is usually put at $1 per ton in the yard.

Increase in Weight and Daily Cost for Food.—The particulars are given in the following table:

Groups.		Weight at commencement.	Weight at close.	Total gain.	Average daily gain of each group.	Average cost of feed per day.
		lb.	lb.	lb.	lb.	cents.
1	1	1,515	1,762	247	1.85	21.02
	2	1,327	1,520	193		
2	3	1,469	1,691	222	1.857	20.74
	4	1,393	1,613	220		
3	5	1,477	1,696	219	1.697	21.40
	6	1,341	1,526	185		

Aggregate weight of the six steers at commencement of the contest	8,522 lb.
Estimated value at 4¼c. per lb. live weight	$362 18
Aggregate weight at close	9,808 lb.
Estimated value at 5 7-12c. per lb. and equivalent to 5¾c. the selling price when shrunk 15 days hence	$547 61
Increase in value in 119 days	185 43
Total cost of food	150 32
Increase in value over cost of food	35 11
Total estimated cost of attendance	18 00
Cost of bedding, 10,800 lb.	8 10
Value of manure, 27 tons	40 50
Value of manure over cost of attendance and bedding	14 40
Weight May 15th at 8 p.m.	10,149 lb.
Weight May 16th at 8 a.m., the steers lying out in yard over night	9,763 lb.
Average loss by shrinkage	64⅛ "

Financial Summary.—The financial results of the experiment stands thus:

Direct gain on food fed	$35 11
Indirect gain from the value of manure over the cost of bedding and attendance	14 40
Direct and indirect profit	$49 51
Or a profit on each animal of	8 25⅙

To this may be added in all fairness the profit from raising the food fed, whatever that might be, for this was estimated at market values.

Conclusions.—The above experiment certainly tends to establish the following important conclusions:

(1) That shipping steers can be fed at a fair profit with prices of grain as at present, when of good types, when they are purchased at reasonable rates and where there are suitable facilities for feeding.

(2) That corn ensilage and meal will fatten as effectively and as cheaply as a ration of roots, hay and meal and with a less expenditure of labor.

(3) That steers fasted twelve hours by simply turning them into a yard at night will shrink from 60 to 70 lb. each.

(4) That with food at present prices, such as that used above, steers weighing from 1,300 to 1,500 lb. can be made to gain on an average 1.801 lb. per day, and at an average cost of 21.053c. per day for the food fed.

(5) That the value of the animals for beefing purposes was increased by the fattening process an average of 1½ cents per pound from commencement to finish.

It will be observed that the ensilage left uneaten by the steers was not wasted but was given to other cattle not under the pressure of high feeding. (See p. 186).

FATTENING LAMBS.

The fattening of lambs or even of sheep has not hitherto received much attention from the Ontario farmer and is therefore not well understood by many. Our object in this and kindred experiments which are to follow, is to ascertain not only the practicability of autumn and winter feeding, viewed from the standpoint of profit, but also the cheapest method of accomplishing this end. Full details of this experiment are given in the bulletin subjoined, which was issued on June 9th, 1890 :—

Bulletin LI.—Fattening Lambs on Rape and Finishing them on a Winter Ration.

This experiment, so encouraging in its results, was commenced Oct. 10th, 1889, and concluded on February 10th, 1890, but the 22 ewe lambs of the lot were not delivered as sold until 14th March, nor the wether and ram lambs until 24th March. They were slaughtered in Guelph and shipped to Halifax.

The Lambs.—Forty-eight grade lambs were purchased from the farmers in the vicinity and were brought to the farm October 9th, 1889. They consisted of Leicester, Cotswold, Oxford Down and Shropshire Down grades, the majority being Cotswold and Oxford-Down grades of good types. They were weighed October 10th and were turned in on the rape to pasture the same day. They remained there until December 3rd, when owing to a snow storm they were brought in to the sheep sheds and were again weighed on December 10th, two months after the commencement of the experiment. While on the rape they were fed in troughs one-half pound each of oats daily and were given salt at will, but they were not given any water.

The Rape.—The portion of the rape field pastured by the lambs comprised eight acres. The rape was sown in drills on July 10th, about ten days later than was intended owing to the wet weather of that time. The field was an outlying one, which was very badly in need of cleaning. The hilly portions which were dry and gravelly had received a light but insufficient coat of barnyard manure. The crop of rape was fair in the valleys but light on the hills. The eight acres, however, would have well sustained 70 to 80 lambs during the period of pasturing, as much of it was still uneaten when the lambs were removed.

Results from Feeding on the Rape.

Aggregate weight of 48 lambs at the commencement of the experiment, October 10th	4,612 lb.
Aggregate weight December 10th, a period of 62 days, of which the last 7 days were spent in the sheds	5,476 "

Aggregate gain	864 lb.
Average weight at commencement	96 "
Average weight at close	114 "
Average gain in 62 days	18 "
Average gain per month	9 "
Average gain per lamb per day	.29 "

Price paid for 48 lambs, October 9th, the date of purchase	$184 70
Average price paid per head	3.84 4/5
Price paid per pound live weight	.04
Estimated value of 48 lambs, December 10th	273.80
Estimated average value	5.70 5/12
Estimated value per pound live weight*	.05
Aggregate increase in value in 62 days	89.10
Average increase in value	1.85 5/8

Feeding Rations in the Sheds.—From December 10th, 1889, to the close of the experiment, February 10th, 1890, the lambs were fed the following daily rations: Grain, consisting of whole oats only, 1.057 lb.; turnips, sliced, 5.107 lb.; clover hay, of rather poor quality, what they would eat.

*This estimated value per pound on December 10 is fixed upon as five cents, as that price could have been obtained for the lambs delivered in Guelph at that date.

Results from Feeding in Sheds.

Aggregate weight of 48 lambs, December 10	5,476 lb.
Aggregate weight of 47 lambs (one having died), February 10	6,020 "
Aggregate increase in 59 days	544 "
Average weight per head, December 10	114 "
Average weight per head, February 10	128 "
Average increase per head in 59 days	14 "
Average increase per head per day	.237 lb.

The whole lot were separated into two and sometimes more than two divisions as occasion required, and were allowed to run in small yards at will except in times of storm. One lamb which weighed 140 lb. died one night in January from the effects of getting on its back. The inferior quality of the hay was caused by coarseness and some damage from stacking. It is to be regretted that owing to lack of facilities the hay was not weighed, as we are thus prevented from getting exactly at the cost of the winter ration, but we feel justified in concluding from the data which we have, that the increase in value during the term of feeding in sheds, including the value of the manure, exceeded the cost of the food, bedding and attendance. They had access to water all the time.

Summary.—Following is a summary of the experiment from beginning to close:

Average weight of 48 lambs at time of purchase, October 10	96 lb.
Average weight of 47 lambs delivered 14th and 24th March respectively, after a fast of twelve hours	137 "
Average increase in weight from October 10	41 "
Aggregate weight of 47 lambs when sold after fasting twelve hours	6,440 "
Price paid for 48 lambs October 9, at 4.005c. per lb. live weight	$184 70
Price received for 47 lambs on the dates already given at 5¾c. per lb. live weight	370 30
Increase in value	$185 60

Average price paid per head October 9	3.84 4/5
Average price received per head when sold	7.71 2/5
Average increase per lamb	3.86 2/5
Increase per lb. live weight	.01¾

The 22 ewe lambs delivered March 14th weighed on an average 129 lb., and the 25 wether and ram lambs 144 lb. It will also be observed that the lambs were sold for more than *twice* the sum paid for them and that the loss of one lamb lessens the return by about $8.50.

Conclusions.—The following conclusions may be drawn from the above experiment :

(1) That good grade lambs may be made to gain 9 lb. per month when pasturing on rape with a supplement of ½ lb. oats per day.

(2) That the same class of lambs may be made to gain 7 lb. per month on a winter ration of clover hay, and say 1 lb. oats and 5 lb. roots per day.

(3) That lambs pastured on rape for two months, with a supplement of ½ lb. oats per day, may be made to increase in value about $2 per head.

(4) That good lambs judiciously purchased at the ordinary selling rates in autumn, and treated as described in this experiment, may be made to increase in value more than the sum paid for them in say 5⅓ months time and on the condition that the buying and selling prices are relatively the same as in this experiment.

(5) That lambs thus purchased and fed may be made to increase in value 1¾c. per lb. live weight.

Note.—Ontario has extensive areas very suitable for growing rape. Would it not be well if the farmers would greatly increase the acreage of this crop and thus adopt an easy mode of manuring their land, an effective way of cleaning it, and a profitable way of disposing of their lambs?

THE RELATIVE VALUES OF CORN ENSILAGE AND FIELD ROOTS FOR PRODUCING PORK.

Corn ensilage has been clearly shown to be of great value in milk production. Its value for making beef is also becoming recognised. There is not so much known regarding its value in pork production. This experiment was undertaken in the hope that more knowledge of this nature would be forthcoming. The bulletin issued on the subject appeared 1st October, 1890. It is given below :

Bulletin LIV.—Corn Ensilage and Roots as Food Factors in Swine Feeding.

This experiment was commenced on January 10th, 1889, and terminated on March 28th, thus covering a period of 77 days. Its primary object was to ascertain the value of corn ensilage and roots, both essentially and relatively, when used as food adjuncts in feeding swine in the winter season. Several other facts of great interest and much value to the farmer were, however, brought out in the experiment, such as the large profits from the judicious feeding of swine, the rate of the daily increase in weight which results from such feeding, and the extent of the mistake in keeping them simply on a maintenance diet.

The Animals Selected.—The animals chosen for the experiment were grade Berkshires, bred upon the farm from a pure sire, and out of three different dams from the same litter. They were divided into three groups. Each group contained three animals, two barrows and one sow. The individuals of each group were from different dams, and one of each of the three was in every instance from the same dam. They were all in good store condition. The conditions therefore at the outset were very similar.

Period of Preparation.—Two weeks prior to the commencement of the experiment each group was put in a separate pen 6 ft. by 10 ft. (all the room available), after having been carefully weighed. They were at once put upon the food ration which was to be given them throughout the experiment. At the commencement of this period the pigs in group 1 fed on meal, weighed 618½ lb. ; those in group 2 fed on roots and meal, weighed

583½ lb. ; and those in group 3 fed on ensilage and meal, weighed 602½ lb. During this preparatory period the pigs in group 1 gained 37 lb., those in group 2 gained 12 lb., and those in group 3 lost 12 lb., as they did not take kindly to the ensilage.

Food and Feeding.—The pigs in group 1 were fed 18 lb. of meal per day for a time. Toward the close of the experiment this was increased to 19½ lb., which however proved a larger quantity than they would eat clean and so cloyed their appetites that the quantity had to be reduced to 12 lb. per day. The average amount fed per day throughout the experiment was 16½ lb. This meal ration consisted of ground oats, ground barley, ground pease and wheat middlings in the proportions by weight of 1, 1, 2 and 1 respectively. Those in group 2 were fed all the sliced turnips they would eat clean, which was 60 lb. per day on an average. They took rather more toward the close of the experiment than at the outset. To the roots was added a meal ration similar in kind to that given to the pigs in the first group, but only one-third of the amount. It averaged therefore 5½ lb. per day, and when fed it was sprinkled upon the sliced turnips. The pigs in group 3 were fed daily 35 lb. of ensilage on an average. The meal fed was similar in quantity and kind to that fed to the pigs in group 2, and was likewise sprinkled upon the ensilage. When feeding the ensilage was masticated by the pigs, but a large proportion of it was not swallowed by them. It had been cut in 1½ inch lengths, which is manifestly too coarse for feeding swine. The food was given in three feeds per day and all the water was supplied that the pigs would take. Those fed on roots took but a small quantity ; those fed on ensilage required more. The water given to the pigs in group 1 was poured on the meal when it was put in the trough.

Value of the Food.—Estimating oats to be worth 28 cents per bushel, barley 40 cents, pease 55 cents and wheat middlings $15 per ton, the average value of the meal ration per pound was seven-eighths of a cent. The roots were valued at 8 cents per bushel and the ensilage at $2.50 per ton.

The following table gives the relative increase in weight and the cost of food during the experiment for each group :—

——	1	2	3
Weight at commencement.....lb.	655½	595½	590½
Weight at close.....lb.	926	735	671
Total gain.....lb.	270½	139½	80½
Average daily gain of one animal in each group.....lb.	1.170	.604	.348
Cost of feeding for 77 days.....$	11.11	9.87	7.07
Cost of food for one animal per day.....cts.	4.81	4.27	3.06

The next table gives the relative values at the beginning and at the close of the experiment, and the net gain or loss :

——	1	2	3
Value at commencement of the experiment.....$	29 50	26 80	26 57
Value at close of the experiment.....$	48 61	36 75	31 87
Advance in value.....$	19 11	9 95	5 30
Net gain or loss.....$	8.00 gain.	.08 gain.	1.77 oss.

The pigs were all valued at 4½ cents per pound live weight at the beginning of the experiment, as this was the price given for such pigs at the time in the Guelph market. At its close those in group 1 were sold at 5¼ cents per pound live weight, those in group 2 were valued at 5 cents per pound, and those in group 3 at 4¾ cents per pound. It may be well to note here that the direct profit on the original investment arising from feeding the pigs in group 1 for 77 days was no less than 27.11 per cent. on the investment, while the direct profiton fattening the steers referred to in Bulletin xlix. was only 9.69 per cent. on the investment in 119 days. The value of the manure made in feeding the pigs would considerably more than pay the cost of the labor. The pigs in groups 2 and 3 were fed for 41 days after the close of the experiment. They were given the same meal ration as before, and each group took on an average 22 lb. per day. They were sold at 5¼ cents per pound live weight on May 9th. During this period the pigs in group 2 increased in weight at the rate of 1.58 lb. each per day, and those in group 3 at the rate of 1.95 lb. each. Those in group 2 were ripe sooner than those in group 3, and this may account for the less rapid gain per day of the former. The total profit on the pigs in group 1 for 77 days was $8.00, that on those in group 2 in 118 days was $4.19, and that on the pigs in group 3 for 118 days was $6.28. In the first instance the whole percentage of profit on the original investment was 27.11 per cent., in the second 15.63 per cent. and in the third 23.63 per cent.

Conclusions.—The following conclusions may be fairly drawn from the above experiment:—

1. That it pays the farmer handsomely to fatten store pigs in winter on a meal ration such as that used in this experiment, when the prices of food and pork bear the same relation to each other.

2. That it does not pay the farmer sufficiently well for the trouble to feed store pigs on a ration of roots in winter when the meal ration used is a small percentage of the whole ration.

3. That when store pigs are fed in winter on corn ensilage and a meal ration, which is but a small percentage of the whole ration, they are fed at a loss.

4. That it will pay better to use a meal ration in winter that will ripen store pigs for market in 77 days, than to first use a ration which tends mainly to develop bone and muscle during that period, followed by a meal ration that will ripen them for market in 41 days.

5. That in fattening pigs it is a serious mistake to attempt to hasten the process by giving any more food than will be eaten clean when it is given.

MAKING PORK FROM GRAINS GROUND AND UNGROUND.

It is a common practice with farmers to feed grain whole in the winter season to store swine, simply because it is the most convenient mode of feeding. This experiment was undertaken to ascertain the extent of the loss arising from this mode of feeding. The subjoined bulletin, issued on December 2nd, gives the more important particulars relating to the experiment and the lessons to be learned therefrom:

Bulletin LV.—Feeding Swine on Grain and Meal.

This experiment began on January 17, 1889, and closed on May 31, covering a period of 134 days. The primary object of the experiment was to ascertain the extent of the advantage arising from feeding swine on a suitable ration of various kinds of meal, mixed, as compared with a grain ration of pease and barley, ground and unground; or, in other words, to demonstrate to the farmers that swine should not be confined to a ration of unground grain in winter, as they oftentimes are, simply because this mode of feeding them may be convenient.

The Animals Selected.—The animals selected for the experiment were Berkshire grades and pure Berkshires, bred upon the farm. They were by a pure Berkshire sire, out of a grade Berkshire dam in the one case and a pure bred Berkshire dam in the other. They were divided into three groups, each group comprising four animals. Three of the four in each group were grades and from the same dam; two of the three were barrows and the third a sow; the fourth animal in each case was a pure Berkshire sow. The grades were farrowed October 4, 1889, and the pure breds September 13.

Period of Preparation.—From December 12, 1889, until January 10, 1890, they were all fed a similar ration of meal and refuse from the college. On January 10, they were divided into three groups, and each group was placed in a separate pen and put upon the ration fed to it during the experiment proper, which commenced on January 17.

Food and Feeding.—The pigs in group 1 were fed pease, barley and oats ground and wheat middlings in the proportions of 2, 1, 1 and 1 parts respectively. Those in group 2 were fed equal parts by weight of ground pease and barley, and those in group 3 were given a similar ration but unground. They were fed three times a day and in quantity all they would eat clean. To the pigs in groups 1 and 2 the water was given along with the meal, and for those in group 3 it was put into a separate trough. They were allowed to run out at will once or twice a week in mild afternoons during cold weather, and more frequently in warm weather.

Estimated Value of the Food.—The food was estimated at the current market values in Guelph, viz.: Pease 55 cents per bushel, barley 40 cents, oats 28 cents and wheat middlings $15 per ton. The average value therefore of the ration fed to the pigs in group 1 was 95c., to those in group 2, 96c. and to those in group 3, 88c. per 100 lb. An allowance of 8 cents per 100 lb. is included in this estimate for grinding the food.

Food Eaten.—The following table gives the food consumed per average animal in each group, (1) throughout the experiment, (2) for the first 28 days thereof and (3) for the last 15 days:

——	1	2	3
	lb		lb
Throughout the experiment	3.07	2.70	2.36
For the first 28 days	2.02	1.87	2.72
For the last 15 days	4.07	2.72	3.32

Increase in Weight.—The next table gives the average weight of the pigs in each group at the commencement of the experiment and at its close, and also the average increase in weight:

——	1	2	3
	lb	lb	lb
Weight at commencement	57.75	52.33	56.12
Weight at close	166.62	133.66	130.00
Increase in weight	108.87	81.33	73.88

Increase in Value.—This table gives the average value of the pigs in each group at the commencement of the experiment and at its close, the average cost of the food fed to each animal, the average increase in value, and the average gain per cent. :

	1	2	3
	$	$	$
Value at commencement.	3.47	3.14	3.37
Cost of food	3.93	2.92	2.79
Value at close	8.75	6.55	6.37
Increase in value	1.35	.49	.21
Gain per cent. on the original investment	38.9	15.6	6.20

The pigs were valued at 6 cents per pound live weight at the commencement of the experiment, which is probably what could have been obtained for them at the time for feeding purposes as they were young. Those in group 1 were sold at the close of the experiment for 5¼c. per pound live weight, and those in groups 2 and 3 were valued at the same time at 4.9c. per pound, as they were not in condition for selling. The value of the manure in this experiment would exceed the cost of the litter and labor.

Additional Particulars.—The pigs in groups 2 and 3 did not look well throughout the experiment. They were dry in the hair and skin, and there was a lack of plumpness about them.

One of the pigs in group 2 became so rheumatic 43 days before the close of the experiment that it had to be removed to another pen and put upon another diet. During the 43 days it gained but 11 pounds. Two of the pigs in group 3 also became stiffened in their limbs. The recovery of these rheumatic animals was very slow and imperfect.

Seven of the pigs in groups 2 and 3 were fed fairly well on a suitable ration until September 11, when they were sold at 5 cents per pound live weight. Their average live weight when sold was only 170 lb., or about 9 lb. more than the average weight of the pigs in group 1 at the close of the experiment more than three months earlier.

The average gain of each of the thoroughbred animals during the experiment was 94.66 lb., while the average gain of each of the grades was but 86.37 lb. or 8.29 lb. less.

While the average daily food consumed by each of the twelve animals during the first half of the experiment was 2.06 lb., and during the last half 3.02 lb., the average daily gain during these respective periods was .72 lb. and .60 lb. ; that is to say, the daily gains were greater during the first half of the experiment although the food consumed was much less.

Conclusions.—The following are the more important of the conclusions from the experiment :

1. That it will pay the farmer well to feed swine of the age indicated in this bulletin, and at the season of the year corresponding, on a ration similar to that fed to the pigs in group 1, the prices of feed and pork bearing the same relations, as the gain in this instance was 38.9 per cent. on the original investment in 134 days.

2. That feeding swine for 134 days on a mixed meal ration similar to that given to the pigs in group 1 is more than twice as profitable as feeding them on a ration of equal parts of ground meal and barley, and more than six times as profitable as feeding them on a ration of equal parts of the same two grains unground.

3. That in feeding swine a mixed meal ration comprising several kinds of grain properly blended is far superior to one composed of but two varieties of the same, even though these two may form important ingredients of the more comprehensive ration.

4. That in feeding swine of the age indicated a mixed meal ration that is well balanced will prepare them for market in a far shorter period than one of either ground or unground grains not so balanced

5. That in feeding swine the respective rations given to the pigs in groups 2 and 3 give results that are far from satisfactory. In both instances one or more of the pigs became affected with rheumatism, in neither case were they ready for the market at the close of the experiment, and in the after feeding the increase in weight was slow. It is indeed probable that they were fed at a loss when the whole results are considered.

6. That in feeding swine when they become rheumatic through feeding a ration too concentrated and stimulating, it will not pay to keep them longer, owing to the slow gains which they make during the period of recovery.

7. That feeding pure bred swine is more profitable than feeding grades, yet too much should not be made of this owing to a little difference in the respective ages.

8. That in feeding swine the cost of producing pork increases with the age of the animal.

FEEDING SWINE ON MEAL AND GREEN FODDER.

The opinion that swine do much better in summer on a ration of grass and meal than on a ration of meal only is almost universal. While this is probably true in the main, it is quite possible that during recent years too much stress has been laid on the importance of pasture in pork production. This experiment was undertaken in the hope of gathering information in regard to the relative values of a meal ration only as compared with a meal and green fodder ration intermixed in producing pork. The bulletin which is given below, and which has recently been issued, gives all the principal details.

Bulletin LIX.—Green Fodder as a Food Factor in Feeding Swine.

This experiment began on June 7th, 1890, and closed October 8th, covering a period of 123 days. The after experiment growing out of it lasted 40 days. Its primary object was to ascertain whether green fodder used as a food adjunct in summer, along with a suitable meal ration, effected a saving in the cost of producing pork, and if so to what extent. A second object was to ascertain whether a large or a small quantity of the green food used in this way furnished the cheaper ration. A third object was to test the correctness of the theory advanced by some scientists which claims that some bulky food mixed with a meal ration in feeding swine secures a more thorough digestion of the meal, since it prevents impaction of the same in the stomach.

The Animals Selected.—The animals selected for the experiment were pure Berkshires and Berkshire grades, all bred upon the farm. There was one of the former in each group. The grades were by a pure Berkshire sire and out of a high grade Berkshire dam, and the pure breds were by the same sire. They were divided into three groups, each group comprised three animals, two of which were barrows and one a sow. The individual animals in each group were from different litters and one animal in each group was in every instance from the same litter. These litters were farrowed at the respective dates, September 11th, 1889, November 25th and December 1st, the pure breds being the oldest. They were all in good store condition at the commencement of the experiment

Period of Preparation.—For one week before the experiment commenced the pig. in the different groups were put upon the ration fed during the experiment. Before thas time they had been fed very similarly on meal and refuse from the college. t

Food and Feeding.—The pigs in group No. 1 were fed all the meal they would take without waste. Those in group No. 2 were fed about three-fourths as much meal as the pigs in group 1, and also a quantity of green fodder. The pigs in group 3 were fed about one-third as much meal as those in group 2. The aim was to make the quantities of meal used in these two instances exactly two-thirds and one-third respectively of the amount fed to the pigs in group 1, but slight variations were caused by the consumption of the latter of quantities of meal not always the same from day to day, when definite changes were made in the quantities of food fed they were always made at the weighing periods, which were every two weeks. The meal ration consisted of ground pease 2 parts, ground barley 1 part, ground oats 1 part and wheat middlings 1 part. These proportions

were by weight. The green food consisted of clover, oats and vetches, and corn and millet as these came in season. It was cut into lengths of about one-half inch by running it through a cutting box, and when fed the meal was mixed with it. Water was always given along with the food.

Estimated Value of the Food.—The food was estimated at the current market values in Guelph, viz.: Pease 55 cents, oats 35 cents and wheat middlings $15 per ton. Eight cents per 100 lbs. were allowed for grinding the meal. The price of the meal mixture used was, therefore, one cent per pound. The green food was charged at $2 per ton.

Food Eaten.—The following table gives the food consumed (1) by each individual animal daily on an average throughout the experiment and (2) the whole amount consumed by the pigs in each group:

——	1	2	3
	lb	lb	lb
By each animal	4½ meal.	3.09 meal. 1.85 green fodder.	1.39 meal. 3.77 green fodder.
By each group	1,520 meal.	1,140 meal. 628 green fodder.	514 meal. 1,392 green fodder.

Increase in Weight.—This table gives the average weight of the pigs in each group (1) at the commencement of the experiment, (2) at its close, the average individual increase in weight and the average individual daily increase:

——	1	2	3
	lb	lb	lb
Weight at commencement	151.0	147.3	147.3
Weight at close	248.3	221.3	167.0
Average increase	97.3	74.0	19.7
Average daily increase	79.0	60.0	16 0

Values.—This table gives (1) the average value of one animal in each group at the commencement of the experiment, (2) the cost of food for one average animal throughout the experiment, (3) the average value of one animal in each group at the close of the experiment, (4) the average individual gain or loss and (5) the average individual gain or loss per cent., (*a*) on value of animals at commencement of the experiment, and (*b*) on value of animals at commencement of the experiment with market value of food included.

——	1	2	3
	$	$	$
Value at commencement	6 79	6 63	6 63
Cost of food	5 07	4 03	2 18
Value at close	12 17	10 84	7 10
Gain or loss	.31 gain.	.18 gain.	1.71 loss.
Gain or loss per cent. on animals	4·56 gain.	2 71 gain.	27.00 loss.
Gain or loss per cent. on animals and food	2.61 gain.	1.69 gain.	19.41 loss.

The pigs were all valued at 4½ cents per pound live weight at the commencement of the experiment, as prime animals brought 5¼ cents per pound at that time. At its close the pigs in groups 1 and 2 were valued at 4 9-10 cents per pound, which was the market value, and those in group 3 were valued at 4¼ cents. As to condition, the animals in group 1 were fat, those in group 2 prime, while those in group 3 were not improved in condition. It will also be observed that the market values had fallen in the meantime. The manure is supposed to form more than an offset to the cost of the labour.

After Experiment.—At the close of the experiment proper on October 8th, a second experiment was commenced to ascertain the probable effects of feeding green food upon pork making during the subsequent fattening period. During this experiment the pigs were all fed upon a ration similar in kind to that fed to the pigs in group No. 1 during the first experiment. This after experiment continued 40 days. At its close on November 17th the pigs were all sold at 4 1-10 cents per pound live weight. The detailed results would unduly enlarge this bulletin. It may be mentioned, however, that though there was a slight relative increase in the rate of gain with the pigs in groups 2 and 3 as compared with those in group 1, it was not at all marked. The prices for prime pork had, in the meantime, fallen from 4½ to 4 1-10 cents per pound, so that the pigs during this period were fed at an actual loss.

Conclusions.—The following are the most important of these :—

1. That while (1) pigs fed for 123 days on a suitable meal ration and housed in summer increase in weight at a rate of 64 per cent., (2) pigs fed on two-thirds the quantity of the same meal ration, the balance of the food being made up of green fodder cut and mixed with the meal, increase at a rate of 50 per cent., and (3) pigs fed on one-third the quantity of the same meal ration, the balance of the food being made up of green fodder cut and mixed with the meal, increase at a rate of only 13.37 per cent., the labor of feeding being also relatively greater where green fodder is given.

2. That when the prices of food and pork are the same, as in this experiment, the gain from feeding pigs, as in group 1, for 123 days in summer will be but 4.56 per cent. on the first cost, as in group 2 but 2.71 per cent., and when fed as in group 3 the loss will be 27 per cent.

3. That in pork making the questions of market values and of the best season to market are of great practical importance.

4. Farmers should study to avoid marketing their pork in the months of October and November, when prices are usually lower than at any other season of the year.

5. That a ration of which the major portion consists of green food, as in the case of that fed to the pigs in group 3, will fail to bring them into a marketable condition.

6. That of the rations given to the pigs in the three groups in this experiment the meal ration fed to those in group 1 has proved in every way the most satisfactory hence,

7. If feeding a bulky fodder along with meal to pigs is any aid to digestion, it must be given in a less proportion than that used in feeding the pigs in group 2 in this experiment.

The Feeding of Cows in the Stable on Green Food.—The object of this experiment was to ascertain the acreage of ground required to sustain one cow during the ordinary season of pasturage, when the food is given to the cow in the stable. Two cows were thus fed from June 10th to September 26th, a period of 108 days. The food was cut from the fields adjoining the stables and consisted of permanent grasses, red clover, lucerne, pease and oats, each being cut in its season. The acreage required to feed two cows for 108 days was 1.559 acres, or for one cow .779 acres. To feed one cow for 165 days, or 5½ months, the average term of pasturage would, therefore, require 1.190 acres. This fact is full of significance, as three acres of pasture are usually allowed for this purpose.

Rearing Grade Steers of Different Breeds.—This experiment was commenced during the winter of 1889-90. Grade calves by pure bred sires and out of common dams were secured of the following breeds :—

	Date of Birth.
Galloway	November 3rd, 1889.
Shorthorn	December 28th, 1889.
Aberdeen Angus Poll	January 1st, 1890.
Hereford	January 5th, 1890.
Devon	January 8th, 1890.
Holstein	February 17th, 1890.
Shorthorn	April 1st, 1890. (Fed on skim milk.)
Native or Scrub	April 16th, 1890.

The Shorthorn grade reared on skim milk was bred on the farm. The others were secured by purchase wherever they could be obtained of a suitable character. The dams, except in the case of the native, were good common cows, possessed of a good share (more or less) of Shorthorn blood. The sires in every instance were registered, except in the case of the native. The calves are all males. Those purchased reached the farm when but a few days old, except in the case of the Galloway, which was 53 days old when it arrived. It was donated to the farm by the breeder, W. Keough, Esq., Owen Sound. Up to the period of its arrival it had been raised upon the dam, and in the transition period, during which it was being taught to drink from the pail, it failed considerably in flesh. This so far detracts from the value of the experiment, but no other grade Galloway calf could be secured at the time.

They were all reared by the pail and were fed on whole milk until six months old. To this diet was added a ration made up of cut hay, timothy and clover, meal consisting of peas, oats and small wheat ground and bran in equal quantities, and green fodder, consisting of clover, peas and oats, when these were in season. After a time oil-cake was added. All the food given to them was carefully weighed and they also were weighed monthly. They were confined in loose box stalls until about six months old. They were then kept tied in double stalls and were allowed to exercise a short time daily in the yard.

It is proposed to keep them until they are two and a half years old and to confirm the experiment by repeating it again and again.

The objects of the experiment should be of great practical value. They include the following :—

1. To ascertain the cost of rearing calves on whole milk.

2. To ascertain the cost of rearing calves on skim milk.

3. To ascertain the cost of rearing calves on whole milk as compared with skim milk.

4. To ascertain the relative cost of rearing during different periods of growth.

5. To ascertain the relative increase in weight during the different periods of growth.

6. To ascertain the relative percentage of gain during different periods of growth in proportion to the food consumed.

7. To ascertain the cost of producing beef up to the age at which it is now most commonly marketed.

8. To ascertain the relative cost of rearing beef animals when fed on whole milk and skim milk respectively during the early stages of their growth.

9. To ascertain the relative value of grades of the beefing breeds and of the native breed, respectively, for beef production.

10. To ascertain the relative value of the different grades used in the experiment for beef production.

At six months old the weights of the different individual animals were :

Class of animal.	Weight, lb.	Gain per day, lb.
Galloway	457	2.54
Shorthorn	530	2.94
Aberdeen Angus Poll	485	2.69
Hereford	545	3.02
Devon	434	2.41
Holstein	535	2.97
Shorthorn (skim milk)	454	2.52
Native	386	2.14

When the calves have all reached the age of one year a bulletin will be issued with full particulars.

Stable Confinement in Calf Rearing.—In this experiment the object was to ascertain the effects of continued confinement on a young animal of the bovine tribes. An Ayrshire grade was put in a box stall, 11 ft. 6 in by 8 ft. 4 in., on 24th May when but four days old, and was so confined for 190 days. At the end of that period it had become so stiffened that it had to be removed and to be allowed exercise daily in the yard. It was fed on a ration of whole milk at first, then whole and skim milk, then skim milk, and as soon as it would eat was given in addition a ration of meal, hay, roots and green fodder. This ration was continued after removal from the stall. It required but two weeks under the changed conditions to entirely remove the stiffness. (See p. 200.)

Berkshire and Yorkshire Pigs.—This short contest was between a pure Berkshire and a Yorkshire boar. It commenced August 19th and ended December 19th, thus lasting four months. A pure Berkshire boar, farrowed June 18th and weighing 25 lbs., was put in one pen August 19th, and the same day a pure Yorkshire boar, farrowed July 4th and weighing 25½ lbs., was put in another The Berkshire was, therefore, ½ lb. less in weight than the Yorkshire at the commencement of the experiment though 16 days older than the latter. During the contest the Berkshire took 30 pounds more meal than the Yorkshire and gained 12½ pounds more in weight. When the experiment closed the Berkshire weighed 167 pounds and the improved Yorkshire 155 pounds. The food consisted of milk, meal and a few roots.

This experiment does not decide very much owing to its short duration and because there was but one animal in each contest and these were not castrated. It is but the introduction to other experiments in this line of much more import.

Grade Lambs Fattened on Rape.—As mentioned elsewhere 54 acres of rape were grown upon the farm. It was our intention to purchase the lambs for feeding off the rape during August, but for reasons which need not be given here we were quite unable to do so. This fact is to me at least a matter of much regret, for had it been in our power to purchase these lambs in the first half of August I am satisfied that our profits on the venture would have been from $100 to $300 more than we realised.

As soon as we were in a position to purchase, the farm foreman set out to buy the lambs in our own and in the neighbouring counties. He became convinced at length that it was hopeless to try and secure them in sufficient numbers in these localities and at prices which we would be justified in paying. Immediately after the McKinley Act was passed dealers at once secured nearly all the lambs available in the localities where they are grown in best form. A search of many days resulted in the purchase of 48 lambs all told and 17 steers. The latter cost $47.50 per head and weighed 1,250 pounds some 10 days after they were brought home. The 48 lambs had been put on the rape during the declining days of September.

The foreman then visited the counties of Lanark and Carleton and purchased 344 grade lambs and ewes (32 of the latter), which reached the farm October 4th and were at once put on the rape.

We then decided that the number was insufficient to feed off all the rape, applied for a fresh grant, obtained it with a commendable promptness and then secured 145 more lambs near Pontypool, in the county of Durham. These reached the farm on the 18th of October, and were at once put upon the rape.

One hundred and three of these lambs (ewes and wethers) were then selected and shorn early in October, with the object in view of preparing them for shipment to Britain It has been stated by those who should be able to give an opinion of much value that if the fleece be removed in the autumn that the animal thus shorn will not only feed better but also ship better than one not so treated. We wish therefore to test the correctness of this theory. We would much rather have had the shearing done about September 1st, had we been in a position to do this. The wool would then afford better protection in winter.

This lot was kept in at night after the shearing and were only allowed to feed on the rape during days of favorable weather. They are now being fed on a ration of hay, meal and roots.

The wool shorn from them and from the lot referred to below averaged about 4 lb. per fleece unwashed and brought 13 cents per pound.

On December 2nd, a lot of 20 lambs was selected and of these 10 were shorn. The two lots will be pitted against each other during the winter in a feeding contest.

The following is a summarized statement of the cost of these lambs and of the net return received for them including the value of those now on hand.

NET COST OF 537 LAMBS AND EWES.

505 Grade lambs averaging $3.33\frac{1}{3}$ each	$	1,684 17	
32 " ewes " $4.22\frac{1}{2}$ each		135 20	
Cash paid in purchasing	$	1,819 37	
Expenditure in buying		54 80	
Freight on 344 lambs (2 cars) from Pakenham to Guelph.		115 20	
Freight on 145 lambs from Pontypool to Guelph		31 20	
Expenses in purchasing		$201 20	
Net cost of 537 ewes and lambs			$2,020 57

NET RETURNS FROM 537 LAMBS AND EWES.

Dec. 1st 1890, sold 32 ewes @ $5.64 to farmers in neighborhood	$	180 50
" 19th, 364 lambs shipped to Buffalo, weight, 35,915 lb., @ $5.62 per 100 lb. live weight		2,018 43
" " For seven lambs slaughtered and 11 pelts		26 75
" " 471 lbs. wool @ 13 cts.		61 23
Net cash return		$2,286 91

VALUE OF LAMBS ON HAND.

Dec. 24th, value of 101 lambs, weight 10,100 lb., @ 5 cts. per pound live weight	$505 00
Dec. 29th, value of 20 lambs, weight 2,000 lb., @ 5 cts. per pound live weight	100 00
	$605 00

Net return for 537 lambs and ewes 31st Dec. 1890, including value of those on hand		$2,891 91
Average price paid for each lamb delivered at Guelph	$ 3 76	
Average price received for those shipped to Buffalo	5 54	
Net profit on the whole transaction up to Dec. 31st, 1890.	871 34	
Net profit on each lamb up to Dec. 31st	1 62	

Some twenty-one lambs were lost from the causes stated below :

Strayed	1
Died from bloating	2
Killed by fighting	2
Died from staggers	3
Found dead on back	2
Died from inflammation of lungs and bowels	3
Sent to butcher on first symptoms of dizziness	7
Killed in car	1
Total	21

The loss was of course charged against the lambs. This is one of the difficulties attendant on rape pastured with lambs. Some suffer from scours which if unchecked leads to fatal disorders. The preventives are a grain ration and abundance of salt to which they have access at all times.

They were left on the rape until 1st December, when they were then fed in sheds, getting a ration of hay and grain, consisting of whole pease and oats until they were shipped.

The weather was unfavorable owing to the unusual amount of rain. Sleet storms and heavy cold rains coming on in the night were no doubt the primary cause of some of the losses indicated above.

Our experience this year confirms the opinion that unless farmers attend to the castration and docking of their lambs, the males which are thus neglected will soon cease to be bought for feeding purposes. They evidently do not fatten so readily, they are very restless, and spend too much time in punching each other, are difficult to sell to the shipper, and do not realise so good a price. It is my conviction that the time is at hand when $1.00 per head more will be paid for good wethers than for rams of equal quality.

THE LIVE STOCK OF THE FARM.

The condition of the live stock of the farm during the year 1890 was on the whole satisfactory. The returns from the same were almost the only returns that we received from any quarter. The losses from disease were certainly reduced to a minimum in the case of horses, cattle and swine. The same is not true of pure bred sheep as will be seen below.

Horses.—The horses were kept in fair condition notwithstanding the constancy of the work. Some attention was this year given to breeding. In the month of April the first heavy draught foal came to hand that was ever bred on the farm. On the 24th of December there was another arrival, also a heavy draught. The aim at present is to have the colts come in the autumn with the object (1) of testing the wisdom and practicability of rearing autumn foals and (2) to enable the dams to rear the foals during the season of slack work. We had no losses from deaths during the year.

Cattle.—Our success with cattle during the year has been almost without parallel This is all the more noticeable because of the fact that in former years this farm has not been more than ordinarily free from the ravages of disease. Tuberculosis and abortion have both held high carnival here, and they may do so again, but at present the live

stock of all classes is apparently entirely free from disease in any form. But one matured bovine was lost during the year and only one calf belonging to the farm proper. The former was valued at $40 and the latter at $10. Another calf was killed by way of experiment to ascertain the effects of suckling a young animal on a dam affected with tuberculosis. The matured animal which was lost was a high grade Ayrshire cow. She was purchased as a milker in October, 1889. At the time of purchase she was giving a good flow of milk, was in fair condition and from external appearances no suspicion could possibly be aroused. She was then giving a large flow of milk and was for the time being the sole dependence of a whole household for their milk supply. For reasons which may not be stated here she was not brought to our stables until more than four weeks had elapsed after the purchase had been made. When she arrived it was at once apparent that she had been considerably reduced in flesh, but was still giving a good flow of milk. There was also a dryness of the hair noticeable and a lack of lustre in the eye which was ominous. Fortunately her milk was not used by the college in a single instance as a robust grade Angus calf was given her to nurse the day she came home. In the face of a full and nourishing ration she became still further reduced in flesh. After time a hacking cough manifested itself. Tuberculosis was suspected and in the month of April she was killed in the class room under the supervision of Dr. Grenside who conducted the post-mortem in the presence of the students and with the result that tuberculosis in one of its worst forms was found present as stated in this report. The grade Angus calf which had sucked the cow until the time of her death and which was then about four months old was isolated and fed by hand until October following when it was also killed in the presence of the students. Tuberculosis had also become developed in a marked degree in the calf as described by Dr. Grenside in the same report. The lesson here is one of great significance and is well worthy of the attention of scientists in every land. The alarming feature of this disease is its insidious nature. It could not be certainly known even by an expert that the calf was assuredly diseased on the morning on which it was slaughtered. It is because of the stealthy way in which its advances are made, that tuberculosis has come to be the greatest scourge of the North American continent amongst the bovine tribes. The calf which was lost and is referred to above as belonging to the farm proper had some affection of the lungs but no indications of tuberculosis was found in the post-mortem. It was simply a case of decline from the effect of a contraction of cold. The cow cost $40. and the calf was worth about $10. A Galloway cow met with an accident in a joint of one leg and was marked down $50 at the annual stock taking. A shorthorn heifer carefully purchased failed to breed and was marked down $10 the difference between the buying and selling value. A pure Angus bull-calf developed unwelcome scurs and was castrated, which however, did not represent a loss so much as a failure to realize a profit. A Galloway bull-calf developed undesirable shapes in a breeding animal and was cut down in value in the annual estimate $18.43. A Jersey cow failed to breed and was also reduced in price $50. A Devon cow not breeding at present was reduced in value $40 although she may yet breed, and two aged bulls sold, an Ayrshire and a Devon realized together $28 less than they were valued at at the commencement of the year. The total value of the pure bred cattle on the farm at the end of 1890 was $5,086.57, of grade cattle $1,894.40 and of horses $2,035. This gives the value of the cattle and horses as $8,993.97. The total loss therefore from death during the year from stock valued at $9,015.97 was only $50. This is a result almost without parallel in the management of live stock, and affords much ground for thankfulness. It is doubtless a result which never before was attained in the history of this farm and in all probability will never be realised again. It reflects much credit on the care and skill of Mr. John Harvey, the cattleman in charge.

It will be remembered that in 1889 two cows were lost from milk fever. Since that time we have taken the precaution to keep the cow in a box stall for some time before calving, and on a ration which is non-stimulating and non-milk producing. After parturition she is given a purgative in the form of one pound of Epsom salts.

Sheep.—The same fortunate record cannot be given regarding the sheep, especially the pure breds. To say that they have done badly is putting it mildly. They wintered well. The crop of lambs were both vigorous and abundant. From 26 breeding ewes

42 lambs were dropped, some few were lost when quite young, but only a small number. When turned out on pasture they made an excellent showing. Some of them soon began to dwindle; now and then one would be found dead in the morning. An examination revealed one form of inflammation or another. At one time it would be in the bowels at another in the lungs. The losses were during the year. The full reasons for the various forms of decline and death which overtook them have not all been ascertained, and with the light that we now have may not be ascertained. This much is clear, that during the two years that the pure bred sheep have been under my supervision they have not done well, not much better, if any, than during the preceding years.

I would fain give all the reasons for this if I could. Much of the soil on the farm is low and produces a grass that is rank and strong, just such grass as is not good for young lambs. It is vain to urge a drainage that will render it impossible for such grass to grow until the elements of nature shall so remould the farm that this will be possible. It is idle to urge that the sheep should be kept on higher land on a farm without one field that has not one or more of those low spots in it which are so fruitful in the elements of sheep producing disorders. It will not avail to argue that good sheep were reared on this farm long years ago, for then the morasses had not been cleared, and as a consequence were completely avoided by the sheep. It should not afford satisfaction to any one to say that sheep do well on adjoining farms, for there are few farms indeed which have no fields without low damp spots in them. I hope that we may in coming years be able to present a more favorable report, but to me at least the outlook is not very encouraging. To those who argue in the meantime that an experimental station should be able to overcome all impediments and obstacles in the way of success, I answer that we will do this just as soon as the unalterable laws of nature that relate to sheep breeding become changed or cease to operate.

Some of the breeds gave better returns than the others, as was to be expected. Adaptability produced effects that were to be looked for. The Southdowns, which are among the lighter breeds and, therefore, better adapted to drier lands, gave the least satisfactory all round results. The Leicester seemed best to withstand the vicissitudes which overtook the sheep. The Dorset-horned came next to the Leicester. They are a decidedly prolific and hardy race of sheep and will in all probability play an important part in the production of early lambs for the Easter markets. It has not yet been fully demonstrated that they will continue to produce two crops of lambs as in England, nor has it been proved that they will continue to breed in autumn at the exact time desired. If experience demonstrates that the Dorset horned breed will produce even one crop of lambs in the late autumn, they will soon become more generally introduced. In that case the lambs could be sold at Easter for high prices, and the dams could also be turned off if desired for the spring markets. We expect much from the Dorsets. They are not only decidedly hardy and prolific, but are of fair size and gentle disposition. The wool is medium and the yield is fair. It may turn out that some grades of mutton are better. If so, a dark-faced ram may be used in crossing. The highest prices have been realised for Shropshires, next to these come the Oxfords.

Notwithstanding our losses with pure-bred sheep, the balance sheet is on the right side. The receipts over the outlay were $219.46 for the year, that is to say, when the inventory of December 31st, 1889, is compared with that of 1890, purchases, sales, losses and deduction in values all being considered, the sum named above shows the profits from the pure-bred sheep, when the food is not taken into account.

Sheep which are brought to the farm for fattening purposes during the later months of the year seem to do remarkably well. This will be at once apparent from the report given regarding this class of sheep, which begins on page 94.

Swine.—The most profitable class of live stock kept on the farm this year was swine. We had but two pure breeds, viz., the Improved Yorkshire and the Berkshire, and in addition a limited number of Berkshire grades. One young Yorkshire sow was on the farm at the commencement of the year and one young boar. Five young sows were imported from England in the month of June at an average outlay of $85 each,

including the cost of purchase and carriage. We had five pure Berkshire sows and one boar, of which one sow was sold at the sale. The two Berkshire grade sows were kept for experimental purposes.

From our limited experience in growing Berkshires and Improved Yorkshires under the same conditions we are not able to throw any light upon the much controverted subject of their comparative merits as pork producers. It would not be safe even to forecast conclusions on this score. Of this we are sure, that both breeds have given excellent results for breeding purposes.

Of the sows which we now have, the Yorkshires seem to require more food to keep them in condition and the same is true of the boars. The Yorkshires are decidedly more prolific. The six litters comprised 54 pigs, the sows in every case being young. The five litters from the Berkshires produced 32 pigs, only two of which were from young sows. The 24 young Yorkshires sold at the sale averaged $10.88 each. The 21 Berkshires averaged $10.95, but the latter were somewhat older. The highest return from one litter of Berkshires was $111. The highest return from one litter of Yorkshires was $112. The total gain on the Yorkshires during the year was $450.25 ; the total gain on the Berkshires was $359. This does not include the food. The sum received for pork sold to the dealer on foot during the year was $441.30. The total gains from pigs during the year was $1,180.55, which, however does not take any of the food into account, except the refuse of the college, for which $60 is allowed for the year.

The losses of swine were light. Some were lost when the litters were young from the over-lying of the dams, as is so frequently the case, but no active disease of any kind was present during the year. The statement which is brought out elsewhere should be borne in mind—the profits on the pork which was sold on foot before October were much higher relatively than those received on pork sold after that date.

FINANCIAL STATEMENT OF THE ONTARIO EXPERIMENTAL FARM FOR THE YEAR ENDING 31ST DECEMBER, 1890.

At the commencement of the year it was decided to keep an account of the receipts and expenditures which might justly be charged to farm proper, that the farmers of this province might be furnished with an approximate statement of the exact financial standing of the farm proper at the close of the year, separate from all the other departments. Before taking stock at the commencement of the year I requested of the Minister that he should name some competent person who would assist in stock-taking, both at the beginning and the end of the year, who would also examine into the method of keeping the accounts, and who would in fact, do the work of an auditor. The gentleman appointed was John I. Hobson, Esq., of Mosborough.

An inventory of all live stock and implements was therefore taken at the commencement of the year. This inventory will be found in the annual report of the farm foreman for 1889. The value put upon the crop grown that year will also be found in the same report. In keeping this account which involved a great deal of labour, the mode of procedure was as stated below :

The farm was charged with :

(1) A proportion of the salary of the farm foreman, mechanical foreman, three-fourths of the salary of the cattle manager and one-fourth that of the farm instructor. The portion of the salary of the parties just enumerated not charged to the farm was set to the account of the Educational and Experimental Departments.

(2) All wages paid for work done on farm proper, whether of men or teams.

(3) All wages paid for student labor done on farm proper, although the wages so paid for work done under the head of permanent improvements, whether of students, men or teams, was deducted from this sum by a contra entry.

(4) All other running expenses whatever as food for stock, seed grain, blacksmithing, repairs, etc.

(5) Cash paid for implements purchased.

(6) Cash paid for live stock purchased.

(7) Cash paid for permanent improvements (see item 5 below under head of expenditure p. 136.) This, however, was all deducted by a contra entry.

(8) Cash paid for educational purposes in connection with the work of the professor of agriculture (see item 6 below under the head of expenditure p. 136). The larger proportion of this also was deducted by a contra entry, the reasons for which will be manifest.

(9) Cash paid for experimental purposes, (see item 7 under the head of expenditure, p. 136).

There was placed to the credit of the farm :

(1) All moneys received from the sale of produce and live stock which went off the farm.

(2) Cash, supplies and labor expended on other departments including College, Experimental, Educational, Horticultural and Dairy Departments and also permanent and temporary improvements.

(3) Increase in the value of live stock, less the decrease in the value of the same.

(4) Increase in the value of the field produce.

(5) Increase in the value of the implements. (See p. 137).

At the end of the year an inventory was again taken in the presence of Mr. Hobson, of the live stock and implements. This inventory and also the valuation of the farm crops grown are given in the report of the farm foreman (see pp. 139-152). The labor done was charged every evening against the proper department and the statement of receipts and expenditures were taken from the monthly rendering of the Bursar's accounts, so that nothing was guessed at or done at hap-hazard. Mr. Hobson examined with minute care the financial statement, and expressed himself as quite satisfied with the equity of the plan adopted in keeping the accounts. This financial statement might have been given in a form more in consonance with the usages of the most approved methods of book-keeping, but the object aimed at was to furnish a simple statement that anyone would understand. (See letter of Mr. Hobson on p. 138.)

EXPENDITURE.

1. *Salaries and wages*—		
(1) Proportion of salary of farm foreman charged to farm proper	$450 00	
(2) Proportion of salary of the mechanical foreman charged to farm proper	100 00	
(3) Proportion of salary of feeder charged to farm proper	300 00	
(4) Farm instructor	100 00	
(5) Wages paid to hired help by farm	2,137 65	
(6) Wages paid to students for labour	1,995 05	
		$5,082 70
2. Running expenses, feed for stock, seed grain, blacksmith bill, repairs, etc	$1,728 81	
3. Cash paid for implements purchased	397 00	

4. *Cash paid for live stock purchased—*

(1) Horses	465 00	
(2) Hereford cattle	254 60	
(3) Ayrshire cattle	176 50	
(4) Devon cattle	140 00	
(5) Holstein cattle	801 00	
(6) Jersey cattle (registration fees)	3 10	
(7) Shorthorn cattle "	5 25	
(8) Grade cattle	1,413 50	
(9) Pigs	620 51	
(10) Sheep	2,051 80	
		$5,931 26

5. *Cash paid for permanent improvements—*

Lumber, wire for fencing, nails, etc		725 51

6. *Cash paid for Educational Purposes—*

(1) Fuel, light, etc., for Prof. of Agriculture (2) Printing, stationery, postage, etc., $50 of this charged against farm (see item 4 under the head of Revenue)		345 74

7. *Cash paid for Experimental purposes—*

(1) Repairs, sundry travelling expenses, etc (2) Expenses and pay of board of management		195 52
Net gain		1,709 25
		$16,115 79

REVENUE.

1. *Cash—*

(1) Farm produce, hay, grain, etc	$442 14	
(2) Horse sold	100 00	
(3) Hereford cattle	117 00	
(4) Galloway cattle	146 30	
(5) Aberdeen Angus cattle	124 90	
(6) Ayrshire cattle	92 20	
(7) Devon cattle	119 70	
(8) Holstein cattle	383 09	
(9) Jersey cattle	112 00	
(10) Shorthorn cattle	322 91	
(11) Grade cattle	1,526 15	
(12) Pigs	1,116 53	
(13) Sheep	3,151 53	
		$7,754 48

2. *Cash, supplies and labor expended on other departments—*

(1) College, milk	697 55	
Food for College horse	75 00	
Food for Bursar's horse	75 00	
Labor, drawing ice, etc	181 82	
	$1,029 37	
Less refuse from College	60 00	
		$969 37
(2) Permanent improvements, cash (see expenditure item 5)	$725 51	
Labor of students and teams on public and private roads	497 46	
		$1,222 97

(3) Experimental Department—Cash, see expenditure item 7	$195 52		
Labor of students and teams	419 47		
Food for horses	140 00		
			$754 99
(4) Educational Department—Food fed to stock, bulls and rams (see explanation 5 on p. 138)	$373 44		
Care of same	79 69		
Depreciation in value of stock bulls and rams	63 00		
Labor of students (instruction), see explanation 5 on p. 97	31 31		
Cash $345.74, less $50, see expenditure, item 6	295 74		
			$843 18
(5) Temporary Improvements—Labor spent on cleaning roads and grounds around the buildings, farm, office work, attending on visitors, etc			343 34
(6) Horticultural Department—Food for two horses and colt, etc			182 00
(7) Dairy Department—Labour of drawing ice, straw, etc			117 45
3. *Increase in value of live stock*—			
(1) Horses	$380 00		
(2) Hereford cattle	200 00		
(3) Ayrshire cattle	165 00		
(4) Devon cattle	25 00		
(5) Holstein cattle	675 00		
(6) Jersey cattle	75 00		
(7) Shorthorn cattle	70 00		
(8) Grade cattle	748 40		
(9) Pigs	639 00		
(10) Sheep	190 00		
	$3,167 40		
Less decrease in value of Galloway cattle	$118 43		
Aberdeen Angus cattle	30 00		
	$148 43		
			$3,018 97
4. *Increase in value of produce, grain, hay, straw, roots, etc*			580 24
5. *Increase in value of implements* (a number were donated)			328 80
			$16,115 79

I now desire to call attention to the following explanations and observations regarding the financial statement just submitted:

(1) The charge made for labor expended on the other departments of the institution was exactly the amount paid to the workmen and students, as the labor was all hired. Team labor was charged at the rate of $3 per day for man and team.

(2) It may be argued that the cash expended on permanent improvements (see item (2) under the head of revenue) should not be all deducted from the net expenditure of the farm, or in other words that part of it should be charged against the farm. Ordinarily this should be done, and perhaps it would have been more equitable to have so charged it this year, but a large portion of this expenditure was incurred for requirements which an ordinary farm would not want. As an offset to this expenditure the improvement of the condition of the farm may be placed. This in the item of weed destruction alone would amount to several hundreds of dollars for the year. One hundred and eight acres were virtually cleaned from a foul condition, and the farm is not credited with this or with any other improvement.

(3) Under the head of temporary improvements (see item 5) of revenue, the farm

is credited with $343.34. Possibly some of this should have been charged against the farm, but not much of it, as the extra labor entailed because of our relations to the public is very considerable. We have visitors in large numbers, and we are glad to have them. They require a guide, and this entails outlay which the farm proper should not bear.

(4) Let it be observed, however, that although the amounts credited as permanent improvements, $725.51, labor of students, men and teams on public and private roads, $497.46, and temporary improvements, $343.34, be added, which gives us $1,566.31, and though this whole sum be charged to the farm, we have still a balance of $143.21 in favor of the farm.

(5) We require to keep stock bulls and rams representing a large number of breeds for educational purposes. We estimated that three-fourths of the cost of the keep of these animals, and of the labor of caring for them should be charged as revenue for the farm (see item 2, (4) under the head of revenue). The animals require to be fed and cared for quite as much as though a full herd or flock of females were kept. The small item of $31.31, charged as labor of students (see item 2, (4) under the head of revenue), arises from loss of time on the part of a number of students attending on machine work, as threshing, etc., while one or other of the number is receiving instruction in such work as feeding the same.

(6) The decrease in values was carefully noted, and was deducted in every instance, whether it applies to live stock or to farm implements.

(7) It may be objected that it is not sufficiently accurate to value the crop grown one year and also that grown another year, and to charge the difference as a revenue or an expenditure for that year. I ask in what way can this be better done? It does not afford a sufficient answer to say that stock should be taken of the crop on hand at the end of the year, for this cannot be done with grain part threshed and part unthreshed, and hay and straw scattered in mows part used and part unused, only in an approximate way. The only real difficulty about our method would arise from a material difference in the amounts of food on hand at the end of the year. But even this difference would in no way affect the accounts for a term of years, although it would affect them for one year. This year a careful calculation has fixed the amount of food on hand December, 31st, 1890, as about equal to the amount on hand 1st January, 1891.

(8) It will be observed that our cash revenue is derived almost entirely from live stock and live stock products sold. Had our dependence been solely or principally on the sale of field produce we would certainly have failed to show any revenue. The methods which we adopted in working the farm are such as may be followed by any farmer. We obtained no extravagant prices for pure bred stock, and a large portion of the return came from meat production.

(9) The balance in favor of the farm is $1,709.25. The size of the farm is 550 acres, of which, say 400 (an approximation) are arable. This is a rental of $3.10 per acre for the whole farm, or for the cultivable portion of $4.27.

(10) It will be observed that there is a difference in the statement of the revenue and expenditure here as compared with the financial statement in Part I. of this report. This difference amounts to some thousands of dollars. It arises mainly from the fact that the farm there, is not credited with supplies furnished by it to the other department, and labor done for the same, nor is it credited with any increase in the value of stock.

The following statement bearing date of January 9th, 1891, was forwarded by Mr. Hobson with the permission to have it appended to the financial statement given above:

Prof. SHAW,

DEAR SIR,—Regarding the accounts it appears to me that they are all right. I do not know that we could apportion them more fairly with perhaps the exception of the amounts charged to temporary improvements. As I understand it a good deal of similar work would require to be done in every well managed farm. However, supposing that to be the case, I am inclined to think that the general improvement of the farm which no credit is taken for in the accounts is enough to offset the items referred to.

Yours respectfully,

JOHN I. HOBSON.

Difficulties in the way.—The difficulties in the way of making the farm pay its way are much greater than appear on the surface to an ordinary observer. The chief of these is connected in one way or another with the question of labor. The work-hands must pay $3.00 a week for board, and washing extra, hence the labor employed is more costly than with the ordinary farmer. Then the student labor cannot be utilized in every instance to the best advantage, owing (1) to its irregularity, as in time of examinations and vacations; (2) to the fact that a large share of it comes at a time of the year when it is not of most value, and (3) to the difficulty of employing a number of persons on many kinds of farm work, to the same advantage as one could be employed.

Will this effort be repeated.—I cannot answer that here. That is not for me to decide, I can only say that I hope it will from year to year. I do not undertake to make the farm proper pay its way every year, but I do think it should be made to pay its way during an average of years.

I feel that I would be recreant to duty if this report were brought to a close without expressing the complete satisfaction given me by faithful assistants in each department, and by the industry and fidelity shown in the work of the farm both on the part of the students and the work-hands.

I have the honor to be, sir,

Your obedient servant,

THOMAS SHAW.

REPORT OF FARM FOREMAN.

To Prof. Thos. Shaw,

Sir, I have the honor of presenting to you my fourth annual report of the department which it is my duty to oversee.

I am pleased to say that notwithstanding the unfavorable season we experienced especially as regards our grain crop, that on the whole I consider it the most prosperous year upon which I have had the honor to report.

The instructions received by the students in the practical work of the farm has received as much attention as it is in my power to afford them, but considering that we are still dependent on one team to give instruction on plowing to a class of about 90 students, you must see that the means for that object is not sufficient. We must also bear in mind that the instructor is also expected to run the farm engine which drives the thresher, chopping-mill, cutting boxes and root pulper, and these require to be run at least two afternoons in the week.

During the months of February and March we have ample time to instruct the students in the management and running of the different machines just named. An evidence of this is shown by the able manner in which the majority of the students acquitted themselves in the practical examinations last June.

I am pleased to call your attention to the fact that notwithstanding the decrease of $600.00 in the wages paid to the students, I have found them the most industrious and practical class that I have had the pleasure of overseeing since my coming here, and more work has been accomplished by them.

A large share of student's labor, together with a great deal of the same, from the regular farm hands and farm teams has been utilized in the making of roads in and around the farm.

The amount expended on labor done by the students for this work amounts to $832.00, while the work done by the farm men and horses for roads and other departments amounts to $661.85.

Cropping.

Owing to the excessive rains which fell in the month of June, our grain crops are certainly below the average.

The crops sown on the low lying ground were injured somewhat by the wet, while those sown on the rolling land were washed off by the continuous heavy thunder showers.

On the other hand our hay crop was above the average, and as there was bright weather for curing it, the principal part came in in good shape.

The following is a list of the field crops as closely as I can estimate :

Field No. 1.—As I stated in my report of 1889, this field was plowed from sod (in the month of September) and sown with rye 2½ bushels per acre. The crop looked rather delicate last spring but afterwards turned out a fair crop.

On the 16th June we commenced cutting, at which time it had attained a height of about 5 feet six inches but showed no signs of maturity.

We cut it with the binder, made large sheaves and shocked it up, and immediately commenced hauling it to the silo, passed it through the ensilage cutter and tramped it tight into the silo.

Six weeks later we opened the silo and commenced feeding it to milch cows, calves and store cattle, all of which ate it with avidity and did well while being fed on it. The return from this field, therefore, in rye is put at 60 tons of ensilage at $1.50 per ton—$90.

When the rye crop was cleared off we immediately plowed the field, harrowed and rolled it and made it into light drills about 23 inches apart and sowed with dwarf Essex rape.

After the rape came up we kept it clean by passing the horse-hoe through as many times as it was possible to do this. A part of it was gone over a fifth time, and the whole of it had four cultivatings.

The rape crop was pastured off by turning on a flock of 505 ordinary grade lambs, purchased in the eastern part of the province, and 32 aged ewes.

The rape crop of fields No. 16 and No. 18 were also pastured off by this flock of lambs.

The lambs and sheep were purchased at a cost of $3.76 per head. This price includes cost of gathering, freight and all expenses in connection with the transaction.

They were turned on at three different dates, viz., 48 in the last week of September, 344 on the 5th of October, and the balance on the 16th of October. A range of small troughs were made to allow them all to feed comfortably by nailing two 6 inch boards together, and each day they were fed some oats.

There is not much danger of overfeeding with oats, as lambs eat very little grain when feeding on rape, and we found that a few of them never eat any oats at all.

The total cost of 537 ewes and lambs purchased by me when delivered at Guelph, including all expenses, was	$2,020 57
The value of the lambs on 31st December, including money received for those sold, was.....	2,891 91
Total gain at that date	871 34

At the time the lambs were taken to the sheds about seven acres of the rape remained untouched ; but it is a difficult matter to calculate how many lambs a field of rape will feed, as a great deal depends on the time that winter may set in.

Field No. 2.—This field contains 17 acres; of which ten acres on the east side were hurdled off to pasture the cows kept by the experimental dairy department, a sum of $4 per acre being charged to that department for pasturage. The balance of the field, seven acres, was meadow and gave a crop of hay yielding 2½ tons per acre.

17½ tons clover @ $6 per ton.....	$105 00
Pasturage, 10 acres @ $4.....	40 00
	$145 00

Field No. 3.—This field contains 20 acres; four acres of which is used by the experimental department in small grain plots. Four acres of a gravel hill on the west side have been planted to trees by the horticultural department. The remaining 12 acres were sown with common six-rowed barley, yielding 19½ bushels per acre.

234 bushels @ 50 cents.....	$117 00
12½ tons straw @ $1.50.....	18 75
	$135 75

Field Nos. 4 and 5.—This field, being one-half of two fields proper, contains 20 acres; the balance of No. 4 being partly planted to trees by the horticultural department, and a part of it, known as the paddock, was used by the experimental dairy department as pasture. It contains

3 acres @ $4	$12 00

Field known as 4 and 5 was used as the root field this year, from which the following root crops were taken:

1 acre white vosges carrots,	600	bushels	@	11 5-6	cents	$	71 00
1 " sugar beets,	9½	tons	@	$4.25			40 37
7 " mangolds,	300	bush. per acre,	2,100	bush.	@ 8 cents		168 00
3 " potatoes,	154⅔	"	464	"	45 "		208 80
8 " turnips,	440	"	3,520	"	8 "		281 60
Total crop							$781 77

The balance of field No. 5 is woodland.

Field No. 6.—This field contains 20 acres, and was meadow, of a mixture of timothy, rye grass, tall oat grass, and lucerne and alsike clover. It yielded 2¾ tons per acre.

55 tons @ $6	$330 00

Field No. 7 contains 20 acres; this field was plowed from sod in the fall of November, 1889, and on the 19th of April was sown with New Zealand oats. About the 18th of June it was struck with a blight, after which it never did well. It yielded 17 bushels per acre.

340 bushels @ 40 cents	$136 00
10 tons straw @ $2.50	25 00
Total	$161 00

Field No. 8 contains 20 acres, and was meadow yielding 2¾ tons per acre.

55 tons @ $6 per ton	$330 00

Field No. 9.—This field also contains 20 acres, and was this year given to the experimental department for the purpose of testing plots of one acre, one-half acre and one-quarter acre each. The yields from these plots were as follows:—

281 bushels oats @ 40 cents	$112 40
54 " spring wheat @ 90 cents	48 60
127 " barley at 50 cents	63 50
17 tons of straw @ $1.50	25 50
Total	$250 00

This field was skimmed over with the two-furrow plows as soon as the crop was cleared off and afterwards plowed deep with single furrow plows.

Field No. 10.—This field contains 20 acres, about one acre of which is taken up with the creamery and stables for dairy cattle, and about five acres are used by the horticultural department as an orchard and for growing small fruits.

The remaining 14 acres were sown with common six-rowed barley and seeded with grasses and clovers of the following mixture per acre:—

5 lbs. timothy,	2 lbs. lucerne clover,
1 " rye grass,	2 " large late clover,
1 " tall oat grass,	1 " alsike.

The barley yielded 21 bushels per acre.

294 bushels @ 50 cents per bush	$147 00
12 tons straw @ $1.50	18 00
Total	$165 00

Field No. 11.—This field contains 20 acres and was cropped as follows : 13 acres of winter wheat, which yielded a very small crop and only of medium quality.

Garfield wheat, 3½ acres, 28 bushels @ 91 cents	$25 48
Bonnell " " 24 " "	21 84
Mediterranean hybrid, 3½ acres, 23 bushels @ 91 cents	20 93
Surprise, 2½ acres, 11 bushels @ 91 cents	10 01
26 tons straw @ $1	26 00
Egyptian oats, 2 acres, 32 bushels @ 40 cents	12 80
New Zealand oats, 2½ acres, 52½ bushels @ 40 cents	21 00
Bavarian " " 65 " "	15 00
10½ tons straw @ $1.75	17 81
Total	$180 87

This field was skimmed with the two-furrow plows as soon as the crop was taken off and the 13 acres of winter wheat ground was sown with rape. The seed was scattered broadcast by hand and rolled. The dry season retarded its growth, but the pasturage furnished was worth a great deal to our young stock. After it was pastured off we plowed the field about eight inches deep and then manured it in preparation for root crop next season.

Field No. 12 contains 20 acres and was handed over to the experimental dairy department last spring to be cropped with corn for experimental purposes, and for the purpose of making ensilage, the manager of that department agreeing to fill the farm silo as a rental for the field. A swamp laying near the centre of this field failed to produce corn and was again plowed up and millet sown on it.

The yield from this field was as follows :

Millet, 2 tons at $5.00	$10 00
Corn ensilage, 50 tons at $1.50	75 00
Total	$85 00

The field was plowed with single furrow plow after corn crop was removed. The farm teams prepared the field in the spring and hauled the corn to silo in the fall.

Field No. 13 contains 20 acres four of which was planted with fruit trees last spring by the horticultural department. The balance, 16 acres was meadow yielding 2 tons per acre.

32½ tons hay at $6.00	$195 00

Field No. 14. This field contains 24 acres, 17 of which are used by the experimental department. The balance, 7 acres were meadow and yielded 2½ tons per acre.

17½ tons at $6.00	$105 00
Pasture 14 cows one month for dairy department at $1.00	14 00
Total	$119 00

Field No. 15 contains 20 acres. It was laid down to permanent pasture in 1884 and it still holds out as the best pasture field on the farm.

Field No. 16 contains 26 acres and was sown with rye 2½ bushels per acre in Oct., 1889. The crop was pastured off last May and June by cattle and sheep.

On June 17, we commenced ploughing it and immediately followed by harrowing, rolling, drilling and sowing with rape, 1½ lbs. per acre. The crop was pastured off by sheep mentioned in report of field No. 1.

Field No. 17. This field contains 17 acres and was cropped as follows: 2½ acres corn for Experimental Dairy Department

3 acres green fodder, oats, tares, and green peas valued at $15.00 per acre	$45 00
3 acres which was allowed to mature at $8.00	24 00
3 " millet, one ton per acre at $5.00	15 00
2 " potatoes, 160 bush. at 45c	72 00

Two acres of this field was used by the Experimental department for the purpose of testing various kinds of roots. The root crop was as follows:

White turnips, 300 bushels at 6c	18 00
Mangolds, 133 bushels at 8c	10 64
Carrots, 161 bushels at 12c	19 32
Potatoes, 163 bushels at 45c	73 35
Total revenue	$277 31

Field No. 18. This field contains 13 acres and was manured this year preparatory to its becoming the experimental field proper. The bulk of the manure was hauled from the city last winter by the farm teams and piled in low flat piles so as to destroy all foul seeds. This was carted and spread in the latter part of July and first week of August and plowed under on 8 acres on west end of the field. It was immediately harrowed and drilled and sown with rape.

The rape was a good crop and was pastured off by sheep, referred to in my report of field No. 1.

Field No. 19. This field contains 30 acres and was cropped as follows:

10 acres tares yielding 5 bushels per acre, 50 bushels at $1.50	$75 00
5 tons tare straw at $1.00 per ton	5 00

3 acres of Mummy peas partly threshed, and estimated at 25 bushels per acre.

75 bushels at 80 cts	60 00

17 acres Prussian blue peas not yet threshed, estimated at 20 bushels per acre.

340 bushels at 64 cts	217 60
20 tons straw at $1.25	25 00
Total	$382 60

Field No. 20. This field lays at the north side of the farm and has been in a wild state until this year. A portion of it is swamp thickly wooded and part of it is cleared. Last spring we hauled rails and made a high strong rail fence between No. 20 and No. 19. On the 25th of May, several head of store cattle were driven into this field and found ample pasture up to the 10th of July, when we were obliged to remove the stock, as the swamp had dried up and the want of water compelled us to drive them to No. 15.

I may here say that it is necessary to have a well dug and a windmill set up in No. 20, as the pasture is to a certain extent wasted for want of water.

Field No. 21. This field contains 13 acres and was sown with oats of 3 varieties as follows:

2½ acres white Bonanza, 14 bushels per acre at 40 cts	$14 00
2½ " American Banner, 17 bushels per acre at 40 cts	17 00
8 " Early Calder, 17 bushels per acre at 40 cts	54 40
13 tons straw at $1.50	19 50
	$104 90
103 bags small potatoes at 30 cts	$30 90
Estimated value of crop of 1890	$3,764 10

Live Stock.

We have had a very successful year as regards our live stock department as is shown by the fact that the losses only amount to one grade cow valued at $40 and a grade calf and a number of lambs, the value of which it is not easy to estimate.

Two colts have been bred. One was sold at the public sale on 7th October, and the other is now five days old and promises to be a good one.

The live stock on hand at the present consists of seventy-eight head of cattle, one hundred and sixty-five sheep, forty-nine pigs and eleven horses for farm use and eight more for the use of other departments.

The silo has been recently opened and we find the ensilage in good condition and the stock seem fond of it.

I may here say that the one silo which we have is certainly inadequate for the amount of stock which is being kept. Another silo is necessary so that the experimental department could carry on their work independent of the farm proper.

We are now feeding the farm stock in the following manner. Hay and oat straw 2-1 being mixed at the cutting box on the barn floor and passed through the cutting box is carried by a short elevator to a shute where it drops into the feed room close to the root pulper which is driven by the same power. Here the cut feed and pulped roots are mixed.

The feed is prepared twice each week and we find that all the feed is eaten without waste.

For the average milch cow we find that a ration of 10 lb. hay, 5 lb. straw, 2 lb. of bran, and 2 lb. of meal with about 25 lb. of pulped roots per day and given in three feeds is a fair ration and some cows even require a less quantity.

We endeavor to give each animal only what will be eaten clean.

In preparing the food for horses, we place the cutting-box in the horse stable loft directly over the feed room so that the cut feed drops down. In the winter season when the work is not heavy, we mix oat straw with hay for horses and also feed carrots once each day.

The mangers of the horse stable are so arranged with a close box at one corner and a large space running across the stall with a slat bottom that we can feed long hay if necessary, but we find least waste of hay by feeding it cut and mixing the meal or bran and hay together.

On the 10th of November the herdsman, (John Harvey) resigned, to go to another stock farm. This change disarranged the work somewhat for a few days, when two young men of the 2nd year class, Messrs. Milne and McKenzie took charge of the stock, and I am pleased to say, that notwithstanding the importance of their college work at that season of the year, the stock was carefully attended to by them.

It is necessary that we should keep from nine to eleven milch cows during the college term to supply milk for the use of the college.

The following is a list of the number of gallons supplied each month. Jan. 191½, Feb. 332⅔, March 425, April 428, May 489½, June 412½, July 342½, Aug. 296¾, Sep. 148½, Oct. 412½, Nov. 432⅓, Dec. 346½.

During the year we have purchased a great deal of grade stock, for the purpose off feeding off the surplus crops of hay pasture, silage and soiling crops.

The following is a list of the stock which has been sold off the farm during the year:—

Fat Cows:

One fat cow	$67,00,	first cost	$42.00,	purchased	1886.
" " "	40.00,	bred on the farm.			
" " "	55.00,	first cost	$68.00,	purchased	1888.
" " "	55.00,	" "	70.00,	"	"
" " "	52.00,	" "	36.00,	"	1890.
" " "	52.00,	" "	50.00,	"	"
	$321.00		$266.00		

The following is a list of cows purchased in January for the purpose of supplying milk to the college and were resold as soon as their flow of milk ceased.

One cow	$25.00,	first cost	$20.00,	purchased	in	January	1890.		
" "	42.00,	" "	40.00,	"	"	"	"		
" "	40.00,	" "	37.00,	"	"	"	"		
" "	38.00,	" "	36.00,	"	"	"	"		
" "	52.00,	" "	50.00,	"	"	"	"		
" "	45.00,	" "	42.00,	"	"	"	"		
" "	44.00,	" "	44.00,	"	"	"	"		
" "	50.00,	" "	47.00,	"	"	"	"		
	$336.00		$316.00						

Ten fat steers were sold in May, having been purchased in October of 1889.

They cost $500 or an average of $50 each, and were sold for $898 or an average of $89.80 each.

The following cattle were sold that were bred on the farm or purchased when young:

Shorthorns :

One heifer	$ 31 00
" "	170 00
One bull calf	53 00
	$254 00

Herefords :

One bull calf	$ 64 00
" heifer "	53 00
	$117 00

Aberdeen Angus :

One bull calf	$ 42 30
" " "	50 00
" " "	40 00
	$132 30

Galloways :

One heifer calf	$ 77 00
" "	69 30
	$146 30

Jerseys :

One heifer calf	$ 75 00

Devons :

One heifer calf	$55 00

Holsteins :

One cow	$ 80 00
" bull	51 85
" "	76 00
" "	70 00
" "	100 00
	$377 85

Ayrshires :

One bull	$ 55 00
" "	41 00
	$ 96 00

The following is a list of the Sheep sold this year :

Cotswolds :

One ram lamb	$ 6 00
" " "	6 00
	$12 00

Leicesters :

One ewe	$ 6 47
" " lamb	8 00
" ram	9 00
" "	31 00
	$54 47

Oxford Downs :

One ewe lamb	$ 25 00
" ram "	29 00
" ewe "	20 00
" " "	26 00
" " "	21 00
	$121 00

Shropshire Downs :

One ewe	$ 28 00
" "	31 00
" "	30 00
" ram lamb	14 00
" " "	15 00
" " "	20 00
	$138 00

Southdowns :

One ewe	$ 15 00
" ram lamb	10 00
	$25 00

Horned Dorset :

One ewe lamb	$ 14 00
" " "	14 00
" ram "	12 60
	$40 60

GRADE SHEEP SOLD THIS YEAR.

Lambs :

22 lambs	$163 30
25 "	207 00
1 "	6 00
7 "	21 00
364 "	2,018 23
27 old sheep	155 25
6 " "	31 00
Total	$2,601 78

SWINE.

Grade Pigs :

8	pigs	$ 81 38
7	"	77 52
3	"	45 00
6	"	94 75
2	"	25 00
7	"	63 65
1	"	10 00
1	"	15 00
8	"	79 00
1	"	2 00
36	"	$493 30

Pure bred Berkshires sold this year.

One	pig	$18 00
"	"	19 50
"	"	7 50
"	"	4 25
"	"	4 00
"	"	8 00
"	"	5 75
"	"	10 50
"	"	13 50
"	"	12 00
"	"	15 00
"	"	18 00
"	"	15 00
"	"	14 00
"	"	13 00
"	"	20 00
"	"	14 00
"	"	11 75
"	"	15 00
"	"	8 00
"	"	9 00
"	"	8 50
"	"	8 25
"	"	25 00
24	pigs	$297 50

Pure bred, improved Yorkshire pigs sold this year.

One	pig	$ 38 00
"	"	8 00
"	"	10 00
"	"	7 00
"	"	6 00
"	"	12 00
"	"	16 00
"	"	13 00
"	"	17 00
"	"	15 50
"	"	16 50
"	"	6 00
"	"	14 00
"	"	6 00
"	"	7 50
"	"	11 00
"	"	10 25
"	"	11 00
"	"	10 00
"	"	8 50
"	"	13 25
"	"	10 25
"	"	6 00
"	"	13 50
"	"	13 00
25	pigs	$299 25

SUMMARY.

Sales of Live Stock made this year :

6	Fat cows	$ 321 00
8	Cows not milking	336 00
10	Store cattle	898 00
3	pure bred Shorthorns	254 00
2	" " Herefords	117 00
3	" " Aberdeen Angus	132 30
2	" " Galloways	146 30
1	" " Jersey	75 00
1	" " Devon	55 00
5	" " Holsteins	377 85
2	" " Ayrshires	96 00
		$2,808 45

Sheep:

452 Grade sheep and lambs	$2,601 78
2 pure bred Cotswolds	12 00
4 " " Leicesters	44 47
5 " " Oxford Downs	121 00
6 " " Shropshire Downs	138 00
2 " " Southdowns	25 00
3 " " Horned Dorset	40 60
	$2,992 85

Swine:

42 Grades	493 30
24 pure bred Berkshires	297 50
25 " " Improved Yorkshires	299 25
	$1,090 05

Total revenue from stock, including hides, service fees, etc. $7,212 34

The following is a valuation of the live stock at present in the stables:

Horses:

One span work horses for farm use	$ 330 00
" " "	375 00
" " "	475 00
" " "	450 00
Single cart horse	70 00
One mare for general use	60 00
" foal 5 days old	25 00
" span horses for experiment and instruction	250 00
	$2,035 00.

CATTLE.

Herefords:

1 Bull, "Conqueror"	$100 00
1 Cow, "Jeranium"	300 00
1 " "Sibyl"	200 00
	$600 00

Galloways:

1 Cow, "Gem"	$75 00
1 Steer, "McCrea," 1 year old	31 57
	$106 57

Aberdeen Angus:

1 Bull, "Bognia of Kinnoul Park"	$250 00
1 Cow, "Kyma"	170 00
1 " "Blooming Rose"	300 00
	$720 00

Ayrshires:

1 Cow, "Nelly May 2nd"	$ 60 00
1 " "Tena"	75 00
1 " "Susie"	125 00
1 " Heifer calf	40 00
	$300 00

Devons:

1 Cow, "Beauty" $100 00

Holsteins:

1 Bull, "America's Grandson" $150 00
1 Cow, "Artis" 375 00
1 " "Alvo" 200 00
1 Bull calf 50 00

$775 00

Shorthorns:

1 Bull, "Baron of Waterloo" $600 00
1 Cow, "Maud 2nd" 150 00
1 " "Lady Joyful" 120 00
1 " "Authoress" 90 00
1 " "Laundress" 125 00
1 " "Matchless of Elmhurst" 350 00
1 Heifer, "Flower of Riverside" 125 00
1 " calf, "*dam Laundress*" 25 00

$1,585 00

Jerseys:

1 Bull, "Pogis of Flamboro" $100 00
1 Cow, "Lisgar's Rose" 300 00
1 " "Helen St. Helier" 100 00
1 " "Oakla Belle" 300 00
1 Heifer calf (dam Lisgar's Rose) 50 00
1 Bull calf (dam Oakla Belle) 50 00

$900 00

GRADE CATTLE.

Cows:

10 Milch cows @ $43.00 ..... $430 00

Steers:

16 Shorthorn grade steers, 2 and 3 years old, weighing *21,931* lb., @ 4 cents per lb $877 24
1 Galloway grade steer, 2 years old (1,390 lb.) @ 4¾ cts. per lb. 66 00

(Under one year old.)

1 Shorthorn grade steer, 1 " " (1,256 lb.) @ 4 " " 50 24
1 " " " 1 " " (1,212 lb.) @ 4½ " " 54 54
1 " " " 1 " " (1,245 lb.) @ 4½ " " 56 02
1 " " " 8 months (669 lb.) @ 4½ " " 30 10
1 " " " 9 " (741 lb.) @ 4½ " " 33 34
1 Aberdeen Angus grade steer weight (685 lb.) @ 5 " " 34 25
1 Shorthorn " " " (835 lb.) @ 5 " " 41 75
1 Galloway " " " (865 lb.) @ 5 " " 43 25
1 Devon " " " (733 lb.) @ 5 " " 36 65
1 Holstein " " " (757 lb.) @ 5 " " 37 85
1 Shorthorn " " " (600 lb.) @ 4 " " 24 00
1 Hereford " " " (841 lb.) @ 5 " " 42 05
1 Ayrshire, under 6 months, grade heifer 12 00
1 Angus " " " steer 6 00
1 Galloway " " " " 7 00
1 Scrub " " steer, weight (485 lb.) @ 2½ cts. 12 12

Total value of grades $1,894 40

SHEEP.

Cotswolds:

1 Stock ram	$ 40 00
4 " ewes @ $15.00	60 00
2 Ewe lambs @ $3.00	6 00
1 Ram "	3 00
	$109 00

Leicesters:

5 Stock ewes @ $12.00	$ 60 00
2 Ram lambs @ $10.00	20 00
4 Ewe lambs @ $10.00	40 00
	$120 00

Oxford Downs:

4 Stock ewes @ $18.00	$ 72 00
2 Ewe lambs " $14.00	28 00
	$100 00

Shropshire Downs:

1 Stock ram (imp)	$120 00
5 Stock ewes @ $25.00	125 00
2 Ewe lambs " 15.00	30 00
	$275 00

South Downs:

1 Stock ram (imp)	$90 00
4 " ewes " @ $25.00	100 00
1 Ram lamb	18 00
	$208 00

Horned Dorset:

1 Stock ram	$ 20 00
2 " ewes @ $20.00	40 00
	$60 00

Grades:

121 Lambs (weight 12,100 lbs.) @ 5cts	$605 00

Total value of sheep $1,477 00

SWINE.

Berkshires:

1 Stock boar (imp)	$100 00
1 " sow	40 00
1 " "	25 00
1 " " (imp)	75 00
1 " "	50 00
1 Young boar	15 00
1 " sow	6 00
1 " "	6 00
1 " "	6 00

Total value $323 00

Improved Yorkshires :

1	Stock boar (imp)	$75 00
1	" sow "	85 00
1	" " "	85 00
1	" " "	85 00
1	" " "	85 00
1	" " "	85 00
1	" " "	85 00
1	Young boar, imp. in dam	15 00
8	" pigs @ $8.00	64 00
	Total value	$664 00

Grades :

1	Stock sow	$15 00
3	Small pigs @ $2 00	6 00
11	" " " 5.00	55 00
8	" " " 3.50	28 00
	Total value	$104 00

VALUE OF STOCK ON FARM AT PRESENT.

Horses	$2,035 00
Cattle	6,980 97
Sheep	1,477 00
Swine	1,091 00
Total value	$11,583 97

The following is an inventory of tools and implements :—

Sleighs :

3	Set sleighs @ $20,00	$60 00
1	Long "	7 00

Waggons :

4	Waggons @ $20.00	80 00
1	Farm truck	50 00
3	Carts @ $8.00	24 00

Miscellaneous :

1	Binder	70 00
2	Mowers $40.00 and $25.00	65 00
1	Hay rake	7 00
2	" " @ $22.00	44 00
1	" tedder	4 00
1	St. George cultivator	17 00
2	Land rollers @ $14.00	28 00
5	Tolton jointer plows @ $12.00	60 00
1	Gale sp. tooth harrow	38 00
1	" "	4 00
1	Eagle sulky "	20 00
1	" spring tooth "	28 00
2	Gang plows (Norwich) @ $12.00	24 00
2	" " (Teeswater) " $15.00	30 00
1	Corban harrow	18 00
1	12-hoe graindrill (Noxen)	65 00
1	9 " " " "	27 00

Miscellaneous—Continued.

2 Sets iron harrows @ $7.50	15 00
2 " " " " $5.50	11 00
1 Root seed sower	28 00
2 Double mould plows @ $9.00	18 00
2 Sod plows @ $9.00	18 00
1 Sub-soil plow	10 00
4 Horse hoes @ $10.00	40 00

Implements:

2 Pea harvesters @ $12.00	24 00
1 Potato plow	2 50
1 Farm cutter	30 00
1 Rood scraper	7 00
1 Farm engine	450 00
1 Grain chopper	25 00
1 Thresher	260 00
1 Cutting box	35 00
2 Fanning mills @ $23.50	47 00
2 Root slicers " $14.00	28 00
1 Farm buggy	60 00
1 Democrat waggon	80 00
1 Office stove	10 00
Small tools	85 30
Total	$2,053 80

Your obedient. servant,

JOHNSTON E. STORY,
Farm Foreman.

REPORT OF THE ASSISTANT SUPERINTENDENT OF EXPERIMENTS.

To Professor Thomas Shaw:

Sir,—I have the honor of herewith submitting the report of the agricultural experiments conducted at this institution during the year 1890. My report including the summary of the readings of the meteorological observations, lysimeters, soil thermometers, drainage waters, etc., and also the chemical analysis of forty-one samples of fodder corn and two samples of ensilage all of which was done in duplicate, during the end of the last and the beginning of the present year, has been handed to Prof. James for the report of the chemical department.

We have been favored with a large measure of success in both the field and live stock experiments, during the year just closing and I wish to express my earnest desire that the results of these practical experiments which have been very carefully conducted might in some way reach the home of every Ontario farmer.

The experiments in the field were even more extensive than last year there being upwards of six hundred plots, averaging from one-hundredth to one acre in size and containing grain, potato, root, forage and grass crops. These made upwards of fifty acres devoted specially to experimental purposes during the present year, and there were also several fields upon the farm devoted to experiments of a more general character.

The season has, on the whole, been favorable for our work, but owing to the excessive wet weather in the earlier part of the summer, I was compelled to drop a few of the root experiments which I had planned for this year.

A number of meteorological instruments placed in one of the experimental fields, and which were read three times daily, show a weather record of much value in connection with our experimental work upon the field plots.

The amount of rain which fell during the five months (May 1st to Sept. 30th) as compared with that for the same period of the three previous years, was as follows :—

	1887. inches.	1888. inches.	1889. inches.	1890. inches.
May	1.58	1.08	3.59	2.18
June	2.36	2.92	4.25	5.31
July	.61	2.21	2.67	1.44
August	2.71	2.16	1.92	1.74
September	1.52	1.55	1.04	.72
Total	8.78	9.92	13.47	11.39

The average temperatures for each month of the same periods were as follows :—

	1887.	1888.	1889.	1890.
May	60.49	50.98	52.3	50.7
June	65.02	64.36	59.8	65.4
July	72.87	67.22	67.8	68.2
August	65.58	66.56	64.4	62.8
September	55.83	54.96	58.3	55.4
Average	63.96	60.78	60.5	60.5

There has been a regular system of live stock experiments conducted throughout the year, as a week has not elapsed during the past twelve months without having two or more experiments under way. At the present time there are fully as many tests being carried on as can possibly be handled to advantage, with the room at our disposal.

In all our experimental work it is very evident that there is a growing appreciation in the work accomplished, and the farmers of Ontario are finding out more and more that it is our highest aim to assist them in the real practice of their farm operations by bringing before them the honest results of experiments of a thoroughly practical nature. According as there is a high appreciation by the farmers of the work done ; as there is a true harmony existing between this institution and the farming community ; and as we, at this experiment station, are honest and faithful in the discharge of the many duties devolving upon us, the greatest good can be expected to follow.

I greatly admire the action you have taken in the greater development of the experimental work of this institution, and specially do I admire your stand in regard to having the experiments so repeated that from them conclusions of great practical value can be shown.

In my report, throughout, I have endeavored to give as concise and at the same time as clear a statement as possible of the various experiments with their results, and will leave the summaries as last year for you to embody in your report.

The following list shows the experiments which have been conducted this year and also the order in which they are considered in the report :—

I.— Field Plot Experiments.

1. *Cereals.*

(*a*) Cereals on small plots.

1. Barleys, tests of varieties.
2. Barleys, different dates of seeding.
3. Peas, tests of varieties.
4. Spring wheat, tests of varieties.
5. Spring wheat, different dates of seeding.
6. Fall wheat, tests of varieties.
7. Oats, tests of varieties.
8. Oats, different dates of seeding.

(*b*) Cereals on large plots.

9. Barleys, tests of varities.
10. Spring wheat, tests of varities.
11. Oats, tests of varieties.

2. *Potatoes and Roots.*

12. Potatoes, tests of varieties.
13. Turnips, tests of varieties.
14. Mangels, tests of varieties.
15. Carrots, tests of varieties.

3. *Forage Crops.*

(*c*) Rape.

16. Rape, grown upon four kinds of soil.
17. Ridged against flat surface in rape cultivation.
18. Fertilisers with rape.
19. Thinning rape to different widths.

(*d*) Permanent pasture grasses.

20. Grasses grown singly.
21. Grasses grown in mixtures.

4. *Co-operative Experiments.*

22. Fertilisers with oats.
23. Corn cultivation.

II.—Live Stock Experiments.

24. Corn ensilage for making beef.
25. Fattening lambs.
26. Corn ensilage and roots as food factors in swine feeding.
27. Feeding swine on grain and meal.
28. Green fodder as a factor in swine feeding.
29. Soiling cows in summer.
30. Grade steers of different breeds.
31. Stable confinement in rearing cattle.
32. Berkshire *versus* Improved Yorkshire as pork producers.

I.—FIELD PLOT EXPERIMENTS.

The experimental plots during the past year have occupied parts of a number of fields over the farm, as some portions are better adapted for experiments of one kind and other portions for experiments of another kind. In cases where we have repeated experiments upon the same land for a number of years, great care has been taken to keep the soil in good condition and in some instances the plots have been run crosswise of those of the previous years and thus we have been avoiding the liability of using to the detriment of the experiment, soil which has become uneven by means of crops of varying growths.

1. Cereals.

The tests of different varieties of cereals during the year just closing, has been more extensive than those of previous years as upwards of three hundred varieties have been grown, which number consisted of imported as well as Ontario grains. The imported varieties were mostly the first and second crop from seed obtained from different parts of Europe, Asia, Africa, Australia, New Zealand and the United States. Among those grains which have been imported, we find some exceedingly promising varieties after two years testing, for among the barleys, wheats and oats are varieties which, in point of yield, considerably surpass those which have been grown in Ontario during a number of years.

We aim to have all of our grains sown in two different places on the farm each year, and the most promising varieties are often sown upon three, four, or even five different plots. Our regular system is: (1) to have the varieties of the same grain always once and sometimes twice or even thrice upon plots of exactly the same size, from which yields per acre are calculated. (2) To have the varieties in single rows with 200 grains in each row. (3) To have some of the most promising varieties in larger plots varying in size from one-fourth to one acre.

(*a*) *Cereals on Small Plots.*

These tests were made to ascertain the relative value of different varieties of grain for Ontario farming and the advantages and disadvantages of different dates of sowing grain.

The plots varied from one-hundredth to one-fiftieth of an acre in size, and were measured off to the fraction of an inch. Stakes were driven at the four corners of each plot, and paths about thirty inches wide were left between each two plots. The grain for the various plots was weighed, bagged and labelled in the barn, and as soon as the land was ready, all the varieties of the same kind of grain were sown the same day, if at all possible. A line was stretched around each separate plot and the grain sown broadcast inside this line. A light narrow harrow was used to cover the grain, and the plots were all rolled when the ground was not sticky. After the grain came up a line was again run around each plot, and every plant which chanced to be outside of the line was cut off, thus making the plots not only very accurate for the experiment but also very neat in appearance. When the grain was ready for harvesting, one man did the whole of the cutting with a cradle, taking in order the different varieties as they were first matured.

In the experimental barn is situated a new separator, small in size and specially fitted for threshing grains of an experimental nature. This machine is driven by a tread power which runs charmingly, and is certainly well adapted for our requirements. In the mow, the floor of which is just beside and a little elevated from the feed table of the separator, was this summer placed a scale with a platform, six feet wide by twelve feet long, made specially for receiving the produce from the plots to be weighed. These scales are very sensitive, and will weigh accurately anything from one-half a pound to thirty-five hundred weight. The grain from the plots is drawn to the side of the barn and pitched upon the floor of the mow, then upon the scales to be weighed, and from the scales to the separator. The mow is quite roomy, and as the cracks in the floor have been puttied and painted, thorough sweeping can be accomplished after each plot has been removed. The four double doors at equal distances from each other along the back of the mow allow of a number of plots being stored away in the barn without danger of mixing.

With our present arrangements, we are enabled to have going on at the same time, the cutting, drawing, weighing, threshing and fanning of the grain as is often found absolutely necessary in properly caring for the crops and making the experiments of the greatest value. During the present year, the separator was running nearly every day from morning till night for about four weeks. At the same time, the grains were being harvested and threshed, collections were being made from the single rows (to prevent injury to the plots) for presenting at the leading exhibitions over Ontario.

(1) Barleys—Test of Varieties.

In range I of the old experiment field formerly known as field 14 of the farm were sown sixty varieties of barley, nearly all of which formed the second trial of the

samples imported two years ago, but a number of the Canadian kinds were also in the list. The yields of barley during the past year was 14.7 greater than that of the average of the varieties of 1889. The soil on which they were grown was a clay loam, which had a crop of barley in 1889 and was manured with farmyard manure last autumn at the rate of fifteen tons per acre. The plots were all exactly the same shape and size, and contained one-fiftieth of an acre each. Seeding took place on April 19th, with seed at the rate of two bushels per acre.

TABLE No. 1 shows the characteristics of fifty-four varieties of barley.

Variety.	Where obtained by O.A.C.	When obtained by O. A. C.	Years grown at O. A. C.	Date of maturity.	Length of plant.	Two or six-rowed variety.	Number of grains per ounce.
					In.		
Cape	New Zealand	1889	1	Aug. 1st.	39	6	611
Chevalier	"	1889	1	" 8th.	40	2	677
Cheyne	Germany	1888	2	" 6th.	33	2	670
Emperor	"	1888	2	" 6th.	34	2	720
Golden Drop	"	1888	2	" 5th.	36	2	646
Hallett's Pedigree	"	1888	2	" 6th.	37	2	630
Oderbrucher	"	1888	2	" 1st.	39	6	743
Phœnix	"	1888	2	" 4th.	41	2	626
Diamond	"	1888	2	" 5th.	43	2	690
Scholey's Chevalier	"	1888	2	" 7th.	37	2	697
Probsteier	"	1888	2	" 4th.	41	2	632
Invel	"	1888	2	" 7th.	39	2	657
Italian Rice	"	1888	2	" 2nd.	28	2	600
Bestehorn	"	1888	2	" 2nd.	40	2	696
Three-rowed	"	1888	2	" 7th.	31	6	736
Golden Melon	"	1888	2	" 7th.	38	2	715
Dutch	"	1888	2	" 5th.	39	2	717
Australian	"	1888	2	" 4th.	40	2	657
Improved Imperial	"	1888	2	" 6th.	42	6	1005
Kalina	Sweden	1888	2	" 4th.	40	2	615
Guymalaya	"	1888	2	" 1st.	39	6	945
Pfanen	"	1888	2	" 3rd.	38	2	549
Kinnakulla	"	1888	2	" 2nd.	37	2	610
Very Early Lapland	Russia	1888	2	July 23rd.	29	6	813
Mandschurei	"	1888	2	" 31st.	40	6	755
Annats	Scotland	1888	2	Aug. 7th.	34	2	703
Chevalier	"	1888	2	" 7th.	38	2	726
Perfection White	England	1888	2	" 9th.	37	2	722
Golden Drop	"	1888	2	" 7th.	41	2	827
Thanet	"	1888	2	" 8th.	42	2	780
Improved Golden Melon	"	1888	2	" 8th.	39	2	770
Early Minting	"	1888	2	" 6th.		2	708
Improved Cheyne	"	1888	2	" 5th.	42	2	747
Improved Beardless	"	1888	2	" 7th.	41	2	735
Selected Chevalier	"	1888	2	" 7th.	41	2	758
Empress	"	1888	2	" 6th.	39	2	790
Imperial	France	1888	2	" 4th.	40	2	717
Large Skinned	"	1888	2	" 6th.	38	2	478
Two-rowed Italian	"	1888	2	" 7th.	40	2	557
Chevalier	"	1888	2	" 4th.	35	2	667
Early Black	"	1888	2	July 31st.	32	6	591
Chevalier	"	1888	2	Aug. 6th.	40	2	657
Two-rowed spreading or fan	"	1888	2	" 4th.	31	2	573
Peerless White	Ontario (Dom. Exp. Farm)	1889	2	" 7th.	37	2	750
English Malting	" " "	1889	2	" 7th.	38	2	668
Beardless	" " "	1889	2	" 6th.	39	2	750
Carter's Prize Prolific	" " "	1889	2	" 6th.	39	2	683
Skinless	Australia	1886	4	July 21st.	34	6	997
Italian	Italy	1888	2	" —	41	2	649
Scotch Improved	Ontario		Several.	" 31st.	40	6	805
Black Hulless	"		"	" —	36	6	633
Mensury	"		"	" 31st.	46	6	786
Common Six-rowed	"		"	" 31st.	33	6	819
Hungarian	Hungary	1888	2	" 4th.		6	930

TABLE No. 11 shows the yields from fifty-four varieties of barley 1889 and 1890.

Variety.	Weight of grain per measured bushel.	Yield of		Yield of grain per acre, bushel per weight—48 lb.			Yield of straw per acre—tons.			Comparative order of grain yield for 1890.
		Grain per plot.	Straw per plot.	1889.	1890.	Average	1889.	1890.	Average	
	lb.	lb.	lb.							
Cape	51	47¼	54	.....	51.3	.....	.....	1.35	.....	4
Chevalier	54⅝	41½	66¼	.....	44.3	.....	.....	1.66	.....	13
Cheyne	53½	47	65	47.9	49.0	48.5	2.73	1.62	2.18	8
Emperor	53	25¾	59¼	36.5	26.8	31.7	2.38	1.40	1.89	46
Golden Drop	53½	38½	57¼	40.6	42.2	41.4	2.20	1.48	1.84	18
Hallett's Pedigree	53⅜	46¼	54¼	34.1	48.2	41.3	1.69	1.35	1.52	10
Oderbrücher	54¼	43⅝	62⅜	44.3	47.2	45.8	1.29	1.55	1.42	11
Phœnix	53	32½	61	46.9	33.9	40.4	1.98	1.52	1.75	36
Diamond	52¾	25½	37	.....	26.6	.....	.....	.92	.....	47
Scholey's Chevalier	53	31¼	45¼	34.4	32.6	33.5	1.74	1.13	1.44	38
Probsteier	52	32½	63½	37.5	33.9	35.7	1.80	1.55	1.68	36
Invel	51½	30	44	22.9	31.3	27.1	1.46	1.10	1.28	40
Italian Rice	50	32	54	45.8	35.1	40.5	1.73	1.35	1.54	34
Bestehorn	52	42	67½	29.1	43.8	36.5	1.64	1.68	1.66	14
Three-rowed	61 1-5	23½	38	26.0	24.5	25.3	1.45	.95	1.15	50
Golden Melon	52⅝	25¼	37¼	31.3	26.3	28.8	1.30	.93	1.12	48
Dutch	44	29¼	70¼	20.8	30.5	25.7	1.15	1.75	1.45	42
Australian	52½	33¾	49¼	....	35.2	.....	.....	1.23	.....	33
Improved Imperial	47⅝	36¼	60¾	28.1	37.8	33	1.59	1.51	1.55	28
Kalina	52⅝	39¼	64¼	35.4	40.9	38.2	1.45	1.60	1.53	22
Guymalaya	61	36	58	34.4	37.5	36	1.58	1.45	1.52	29
Pfaner	52	28	41½	28.1	29·2	28.7	1.61	1.03	1.32	44
Kinnakulla	48⅓	25¼	44¾	24.5	26.3	25.4	1.66	1.11	1.36	48
Very Early Lapland	48	15¼	33¼	.....	15.9	.....	.....	.83	.....	53
Maudschurei	51¼	49¾	51¾	42.7	51.9	47.3	2.10	1.29	1.70	3
Annats	52	28½	43½	22.9	29.7	26.3	1.30	1.08	1.90	43
Chevalier	53⅜	27¼	42¾	24.0	28.4	26.2	1.20	1.06	1.13	45
Perfection White	52	34¾	53¾	18.8	36.2	27.5	1.11	1.34	1.23	30
Golden Drop	51¼	40¾	65¼	28.6	42.4	35·5	1.58	1.63	1.61	17
Thanet	50½	48⅝	66¾	26.0	50.5	38.3	1.36	1.66	1.51	6
Improved Golden Melon	51½	41¾	54¼	34.4	43.5	39	1.61	1.31	1.46	15
Early Minting	51¼	41½	61½	.....	43.2	.....	.....	1.53	.....	16
Improved Cheyne	52½	46½	72½	29.6	50.2	39 9	1.68	1.81	1.75	7
Improved Beardless	50½	37¼	61¾	27.6	38.6	33.1	.....	1.54	.....	26
Selected Chevalier	50½	50½	54½	33.3	52.6	43	2.14	1.36	1.75	2
Empress	51¼	45¼	76¼	43.7	47.1	45.4	1.94	1.90	1.92	12
Imperial	52¼	40¼	66¾	39.6	41.9	40.8	1.90	1.66	1.78	19
Large Skinned	63	21	39½	36.5	21.9	29.2	1.75	.87	1.31	31
Two-rowed Italian	52½	22½	75½	39.6	23.4	31.5	2.08	1.88	1.98	51
Chevalier	52⅓	51½	62	39.6	55.4	47.5	1.78	1.55	1.67	1
Early Black	51	47	78½	40.6	49.0	44.8	1.25	1.96	1.61	8
Chevalier	54½	39½	62½	.....	41.2	.....	.....	1.56	.....	21
Two-rowed Spreading	49½	31¼	.....	36.5	32.6	34.6	1.50	.....	.....	38
Peerless White	53	34½	49¼	29.6	36.2	32.9	1.60	1.23	1.42	30
English Malting	52¾	34	49½	25.5	35.4	30.5	1.71	1.23	1.47	32
Beardless	52⅛	33	51	21.9	34.4	28.2	1.38	1.27	1.33	35
Carter's Prize Prolific	52	34⅜	54⅜	26.6	38.0	32.3	1.59	1.36	1.48	26
Skinless	60½	8½	.....	29.9	8.9	19.4	.68	.....	.....	54
Italian	51⅞	37¼	65¾	5.7	38.8	22.3	2.41	1.64	2.03	24
Scotch Improved	52	39¼	49¾	47.9	40.9	44.4	1.30	1.24	1.27	22
Black Hulless	63¾	30	50	...	31.3	.....	.....	1.25	.....	40
Mensury	51⅛	37¼	49¾	...	38.8	.....	.....	1.24	.....	24
Common Six-rowed	54½	40	55½	41.7	41.7	41.7	1.19	1.38	1.29	20
Hungarian	62¼	49	63	8.3	51.0	29·7	.....	1.57	.....	5

(2) Barley—Different Dates of Seeding.

Barley was sown at three different dates, to ascertain some facts regarding the relative yields from different dates of seeding the present year. The plots were one-hundredth of an acre in size and were in duplicate in each case. Soil was a clay loam, manured in the winter of 1889. The barley sown was the Maudschuri which was put in at the rate of two bushels per acre. Pressure of work prevented seeding earlier than May 1st, but it is important to notice that the same variety seeded in the plots for testing varieties on April 18th gave a yield of 51.9 bush per acre. In an experiment in testing different dates of seeding barley in 1889, it was found that the yield from seeding on May 5th was 65.3 per cent. less than on April 15th, and that on June 7th it was 59.1 per cent. less than on May 5.

Table No. III shows the yields of barley from three dates of seeding.

Dates of seeding.	Separate plots.	Duplicate tests for each date of seeding.			Average of yields for each date of feeding.		
		Weight per measured bush.	Straw per acre, tons.	Grain per acre, standard bushels by weight.	Weight per measured bush.	Straw per acre, tons.	Grain per acre, standard bushels by weight.
May 1st	A	48¾	.91	31.8	49.88	1.02	37.3
	B	51.0	1.13	42.8			
May 9th	A	45½	.98	26.4	46.25	1.04	31.2
	B	47.0	1.11	35.9			
May 17th	A	42.0	.80	18.8	41.88	.77	18.0
	B	41¾	.74	17.2			

(3) Peas—Different Varieties.

There has been tested during the present year twenty varieties of peas, but owing to the very wet weather at the earlier part of the season the yields are somewhat smaller than usual. The yield per acre of our varieties of last year was 32.9 bushels and for 1890 the yield was only 21.6 bushels per acre. Seven varieties situated in another portion of the field and somewhat later than those reported upon were so injured by the wet that no reliable conclusions could be drawn and the peas were not harvested separately. The soil upon which the twenty varieties were grown was a clay loam, manured last winter, at rate of fifteen loads per acre of farm yard manure. The seeding took place on April 24th, and the rate of seeding each variety is shown in the following table. The results are arranged in two parts in the tables. The first table gives the characteristics of the varieties and the second the figures regarding the sizes, weights, etc, of the peas of different kinds and the yields per acre :

TABLE No. IV shows the source and general characteristics of twenty varieties of peas.

Variety.	When and where obtained by O.A.C.		Years grown at O.A.C.	Quantity of seed sown p. a.	Date of		Average.		Width of pod.	Length of a row of ten peas touching each other.	Color of peas.	Outside character of peas.
	Country.	Year.			Seeding.	Maturing.	Length of vine.	Length of pod.				
				bus.			inches.	inches.	inches.	inches.		
Sweet Jessie	England	1888	2	2½	April 24	Aug. 11	42	2	½	3½	Light brown.	Slightly indented.
Early Britain	"	1888	2	2½	" 24	" 11	60	2¾	5/8	3	Brown.	Somewhat indented.
Perfection White	"	1888	2	3	" 24	" 9	36	2½	¾	3⅝	White.	Outline rather irregular.
Earliest of all Blue	"	1888	2	2	" 24	July	30	2	½	2½	Blue.	Smooth.
Glory	"	1888	2	3	" 24	Aug. 12	33	2¾	3-5	3¾	Light blue.	Rough and irregular outline
Early Racehorse	"	1888	2	2	" 24	" 10	52 5-6	2½	7-16	2½	White.	Smooth.
Hero of Reading	"	1888	2	3	" 24	" 10	42	2¾	5/8	3⅞	Blue.	Medium.
Selected Maple	"	1888	2	2	" 24	July 27	36	.....	½	2⅝	Dappled brown.	Indented.
Veitches Perfection	"	1888	2	2	" 24	Aug. 12	25	3	5/8	3½	Light blue.	Crinkled very much.
Princess Royal	"	1888	2	3	" 24	" 9	36	3	¾	3½	White.	Nearly smooth.
Brown	New Zealand	1889	1	3	" 24	" 11	36	2¼	5/8	3	Brown.	Slightly indented.
Blue	"	1889	1	3	" 24	" 5	48	2¾	5/8	3	Blue.	Slightly indented.
Field	"	1889	1	2	" 24	" 7	58	2¼	½	2¾	White.	Smooth.
White Wonder	"	1889	1	2½	" 24	" 5	26	2¼	½	3⅛	White.	Smooth.
Mummy	Ontario	1889	1	3	" 24	" 11	38	2	½	3	White.	Smooth.
Black-eyed Marrowfat	"	.....	Several.	3	" 24	" 11	61	2¾	5/8	3⅝	White (black eye.)	Smooth.
White-eyed Marrowfat	"	.....	"	3	" 24	" 11	49	2½	½	3⅜	White.	Smooth.
Grass	"	.....	"	2	" 24	Sept. 10	31	1½	½	2⅓	White.	Rough and angular.
Multipliers	"	.....	"	2	" 24	.....	65	2 3-5	½	2⅞	White.	Smooth.
Prussian Blue	"	.....	"	2½	" 24	.....	64	2½	½	2¾	Blue.	Smooth.

TABLE No. V shows the comparative results of twenty varieties of peas.

Variety.	Peas per pod.	Peas per ounce.	Grain per measured bushel.	Yield of straw per acre.	Yield of grain per acre (60 lb. per bush).	Comparative order of grain yield per acre, 1890.
	No.	No.	lb.	Tons.		
Sweet Jessie	4½	103	62¾	.82	31.16	1
Early Britain	3⅙	110	60	.57	28.37	4
Perfection White	3½	86	61	1.22	14.88	16
Earliest of all Blue	4 1-10	154	64	.42	10.46	18
Glory	4	82	62½	.98	26.04	7
Early Racehorse	5	144	64¼	1.06	29.29	2
Hero of Reading	4⅓	93	63	.89	26.27	6
Selected Maple	5¼	156	64½	.72	20.00	14
Veitches Perfection	4	81	58	.67	10.46	18
Princess Royal	4	80	63½	.57	13.02	17
Brown	4 1-7	105	60¼	.95	23.25	12
Blue	6	100	65½	1.11	18.14	15
Field	4 13-20	122	64½	.89	25.34	8
White Wonder	3	138	64¾	.80	27.67	5
Mummy	3	106	65¾	1.26	28.60	3
Black-eyed Marrowfat	4⅔	92	62	1.04	23.72	11
White-eyed Marrowfat	4	77	63¼	.93	21.16	13
Grass	3	212	66	1.51	5.12	20
Multipliers	4⅔	188	62½	1.44	25.34	8
Prussian Blue	4½	132	64	1.25	24.65	10

(4) SPRING WHEATS—TESTING OF VARIETIES.

There are three tables of spring wheats; the first being the results of eleven varieties which have been grown in Ontario for a number of years; the second being a report of the second crop from imported seed; and the third gives the results of the crop from imported seed two years old. Owing to 1889 being a very unfavorable season for spring wheats, and as some of the grains were late in getting here and therefore not ready for early seeding, we have taken the original seed of thirty varieties and given them a fair trial the present year. The following varieties were discarded at the end of 1889 as being totally unsuited for our climate: Crystal Rock, Sebastopol, Azima, Danubian, Dantzic White, Red Chaff White, Champion White, Selected Talavera White, Improved Red Nursery, Malaga White, Grand Cianco, Square Head, Egyptian, Spelz (Switzerland), and Early Japan.

The spring wheats of the first two tables were sown on April 25, and those of the last table were sown on April 26, upon plots one-hundredth of an acre in size. Soil of those of the first two tables was a clay loam, and that occupied by those of the third table was clay loam with a large percentage of vegetable mould. The grain was sown at the rate of two bushels to the acre.

TABLE No. VI shows the comparative results of eleven varieties of spring wheat, the seed of which was obtained in Ontario:

Variety.	Date of Maturity.	Length of plant.	Amount of rust. (1 to 10 being the standard adopted).	Weight of grain per measured bushel.	Yield of straw per acre.	Yield of grain per acre (bush. 60 lbs.).	Comparative order of grain yield per acre, 1890.
		Inch.			Tons.		
Red Fyfe	August 12	47	3	59½	1.95	15.83	5
Ladoga	" 5	42	2	56½	1.33	12.5	9
Wild Goose	" 12	52	1¾	62¾	2.27	12.9	8
Red Fern	" 11	48	¾	60	1.76	21.9	3
White Fyfe	" 14	50	3	60	1.39	26.9	1
White Russian	" 11	44	3	57¼	1.91	22.1	2
Colorado	" 6	52	3	61	1.07	15.8	6
Triumph	" 5	42	3	60	1.01	16.	4
Green Mountain	" 10	41	3	56½	1.32	12.5	9
Colorado	" 6	50	3	59¾	1.17	15.8	6
Lost Nation	" 14	38	4	56	1.00	8.8	11

TABLE No. VII shows the comparative results of spring wheats, most of which are the second year's testing of imported varieties.

Variety.	Where seed was originally obtained.	Date of maturity.	Length of plant.	Amount of rust. 1-10.	Weight of grain per measured bushel.	Yield of straw per acre. (Tons.			Yield of grain per acre. (Bushels by weight, 60 lb.)			Comparative yield of grain, 1889 and 1890.
						1889.	1890.	Average	1889.	1890.	Average	
Pringle's Champion	Germany	August 12	43	¼	59½	1.4	1.9	1.6	15	21.2	18.1	2
Holben's Improved	"	" 14	42	1½	58½	.5	1.7	1.1	11.7	20.4	16.1	4
Summer	"	" 9	38	1½	58¼	1.5	1.5	1.5	10.0	17.5	13.8	5
Saxonka	Russia	" 11	42		57¼	.....	1.0	.. ....	11.7	10 6	11.2	9
Odessa Ghirka	"	" 12	43	2	60	1.4	1.5	1.5	8.3	15.8	12.1	6
Konisburg	"	" 11	44	½	62⅜	1.4	1.5	1.5	10.9	12.2	11.6	8
Dantzic	"	" 13	42	1	58½	.....	1.4	.....	8.3	12.5	10.4	10
Ordinary March	France	" 8	39	3	51¼	1.2	.9	1.1	6.7	7.1	6.9	13
Red Bearded March	"	" 6	36	2	57	1.3	.9	1.1	10.0	10.8	10.4	10
Herison Bearded	"		44	¼	64	1.5	1.9	1.7	18.3	27.2	22.1	1
Bearded Red	"	6	41	.....	58	.8	1.2	1.0	6.7	13.3	10.0	12
Ladoga	Ontario (Dominion Experimental Farm)	" 5	38	1	56½	.....	1.0	.....	8.3	15.8	12.1	6
Bart Trimenia	Greece	" 10	42	¼	64	1.0	1.6	1.3	6.7	26.3	16.5	3

TABLE No. VIII shows the comparative results of thirty varieties of imported spring wheat.

Variety.	Where seed was obtained.	Date of maturity.	Bearded or bald.	Length of plant.	Length of head.	Amount of rust.	Weight of grain per measured bushel.	Yield of straw per acre.	Yield of grain per acre, bushels by weight (60 lbs.)	Comparative order of grain yield, 1890.
				in.	in.	1-10	lb.	Tons.		
Chidham White	Germany	Aug. 12	Bald	40	2¾	2½	52.3	1.17	10	15
King Bartigen	"	" 11	Bearded	57	2½	1½	56	.91	9.6	16
Fern or April	"	" 14	Bald	38	2¼	4	.....	1.08	2.9	30
Nenhert	"	" 12	"	43	3	3	49.5	1.25	6.7	21
Triticum Spelta	"	" 9	Bearded	46	3½	4	35	.73	18.8	1
Poland	Russia	" 11	"	44	4¼	2	51	1.25	8.9	20
April Bearded Red	England	" 11	"	47	3½	2½	50.8	1.72	9.2	18
Lonzelle White	France	" 14	Bald	38	2¾	2½	47	1.45	5.0	25
Large Flag	"	" 9	"	29	2¼	5	51.2	.66	6.3	23
French Summer	"	" 9	"	34	2½	3	52.8	1.09	10.2	13
Hickling's March White	"	" 11	"	41	2¼	2	43.9	1.16	3.8	28
Ordinary Bearded March	"	" 10	Bearded	40	2½	1½	57.5	1.52	17.5	2
March de Brie	"	" 11	Bald	41	3	3½	53	1.66	11.3	12
Rousselin	"	" 12	"	40	2½	½	.....	1.01	2.1	31
Paros	Greece	" 11	Bearded	43	2½	1	57.5	1.26	13.8	6
Voto	"	" 11	"	45	2½	1	58.0	1.36	12.9	8
Grecian	Russia	" 10	"	42	2¼	¾	59.9	1.28	13.8	6
Missogen	Greece	" 11	"	40	2½	½	58.9	1.27	14.2	5
Atalank	"	" 11	"	44	2½	1	57.5	1.23	12.1	10
Sorentino	Italy	" 10	.....	47	2	1	60	1.12	15.0	3
Neapel	"	" 11	Bearded	38	2	5	51.5	1.28	9.6	16
Square Head	Sicily	" 9	Bald	34	1½	7	49.5	.95	5.0	25
Red Wheat	"	" 12	"	34	1¾	7	.....	.87	6.7	21
Mountain	Hungary	" 12	"	27	2¼	2	58.8	.67	9.2	18
Banter	"	" 14	Bearded	33	2¾	2	55	.88	4.6	27
Medeah	Africa	" 9	"	47	2¼	2¼	62.5	.62	15.0	3
Algiers	"	" 10	"	43	2½	1	58.3	1.16	12.1	10
African	"	" 10	Bald	37	2¼	9	.....	.65	3.3	29
March White	California	" 5	"	41	2	2	56	.89	10.2	13
Egyptian	Egypt	" 18	Bearded	47	2¾	5	15	1.50	5.8	24

(5) SPRING WHEAT DIFFERENT DATES OF SEEDING.

The spring wheat used for this test was the Red Fyfe. The seedings took place just eight days apart, upon plots one-hundredth of an acre in size. The plots for each seeding were in duplicate as may be seen by the table. The soil consisted of a clay loam with a slight bearing to vegetable mould. Grain was sown broadcast at the rate of two bushels per acre. Unfortunate for the experiment, No. B. plot of May 17th, seeding is not reported upon owing to some mistake in handling the produce. The same variety of wheat seeded in another place on April 25th, upon soil very similar to that upon which the test was conducted gave a yield at the rate of 15.83 bushels per acre, being nearly one-half as much again as that seeded on May 1st.

TABLE No. IX shows the yield of spring wheat from three dates of seeding.

Dates of Seeding.	Separate Plots.	Duplicate tests for each date of seeding.			Average of yields for each date of seeding.		
		Weight per measured.	Straw per acre.	Grain per acre bus. by weight (60 lbs.)	Weight per measured.	Straw per acre.	Grain per acre bus. by weight. (60 lbs.)
		bus.	tons.		bus.	tons.	
May 1st	A	57.5	1.4	11.7	57.4	1.35	10.65
	B	57.3	1.3	9.6			
May 9th	A	57.	1.0	7.1	56.5	1.15	6.25
	B	56.	1.3	5.4			
May 17th	A	56.	1.4	5.4	*56.0	1.4	5.4
	B	.....	.....	.....			

* Only one plot with spring wheat seeded on May 17th. B. unfortunately destroyed.

(6) FALL WHEATS—TEST OF VARIETIES.

There were eighteen varieties of fall wheats tested of which the seed was obtained in Ontario, and thirty-one varieties of which the seed was imported from foreign countries. Twelve of the imported varieties proved to be total failures, while some others are quite promising. The winter was very severe upon fall wheats, and especially upon those which were grown in this climate for the first time. The plots were situated in field No. 17 of the farm upon the side hill sloping to the south-west. Each plot was one-hundredth of an acre in size, consisting of clay loam and was manured in the fall of 1889. The seeding was done upon September 10th, except six varieties of the Canadian sorts which were not sown until later, owing to delay on part of seedsmen. Grain was sown at the rate of two bushels per acre.

TABLE No. X shows the results of the tests with eighteen varieties of fall wheats from Ontario seed.

Variety.	Date of seeding.	Date of maturing.	Strength of straw.	Amount of rust.	Bearded or bald.	Color of grain.	Weight of grain per measured bushel.	Yield of straw per acre.	Yield of grain per acre, bushels by weight (60 lbs.)	Comparative order of grain yields, 1890.
				1-10			lb.	tons		
Golden Drop	Sept. 10	July 25..	Medium..	2	Bald ...	Golden ...	61.2	2.34	32.5	5
Surprise	" 10	" 19...	Strong ...	1½	" ..	White....	58.7	2.83	29.6	12
Manchester	" 10	" 23...	Medium..	5	" ...	Amber ...	61.0	2.41	30.4	11
Bonnell or Landreth	" 10	" 25...	Strong ...	1	" ...	White....	61.0	2.51	32.1	7
Seneca or Clawson	" 10	" 25...	" ...	1	" ...	"	59.0	1.74	25.4	15
Rogers	" 10	" 27...	" ...	2	" ...	Amber ...	60.8	2.74	34.6	3
Hybrid Mediterranean	" 10	" 21...	Weak ...	3¼	Bearded	" ...	60.2	2.35	32.1	7
Martin Amber	" 10	" 27...	Strong ...	2	Bald ...	" ...	62.5	2.03	32.5	5
Standard	" 10	" 24...	" ...	3	" ...	White ...	59.3	2.13	31.7	10
Red Velvet Chaff	" 10	" 23...	" ...	2	" ...	Red.....	61.0	2.48	35.8	2
Lancaster	" 10	" 20...	Weak ...	2	Bearded	"	61.8	3.33	33.3	4
Early Red Clawson	" 10	" 22...	Strong ...	2	Bald ...	"	58.0	2.51	32.1	7
Volunteer	" 12	" 19...	Medium..	3	Bearded	"	58.5	3.18	36.3	1
Golden Cross	" 19	" 20...	Strong ...	3	"	"	58.0	2.56	27.9	14
New Monarch	" 19	" 27...	" ...	3	Bald ...	"	56.7	1.88	20.0	16
Red Lion	" 19	" 23...	" ...	2	Bearded	"	60.0	2.20	29.2	13
Democrat	" 27	" 28...	" ...	4	"	Amber ...	56.5	2.18	20.0	16
Garfield or Natural Cross	Oct. 7	" 28...	" ...	2	Bald ...	White....	57.0	1.65	15.8	18

TABLE No. XI shows the leading characteristics of nineteen varieties of fall wheat, the seed of which was imported.

Variety.	Country from which seed was obtained	Power of withstanding the severe winter.	Date of maturity.	Length of straw.	Strength of straw.	Amount of rust.	Length of head.	Color of chaff.	Bearded or bald.
				in.		1-10	in.		
Galizien Summer	Germany.	Good—medium	July 25.		Strong	1		White	Bald
Dividend	"	"	" 30.	56	"	5	3½	Red	"
White Square Head	"	Medium	" 30.	51	"	4	2¼	White	"
One Grain Speltz	"	Good	Aug. 5	37	"	0	2	"	Bearded
Russian Odessa	Russia	Medium	July 30.		Weak	4			Bald
Herefordshire	England	"	Aug. 1	50	Strong	4	3¼	Red	"
Spalding Red	"	Poor	" 2	43	"	2	2¼	"	"
Kessingland Red	"	"	" 4	41	"	4	3½	White	"
Golden Drop Red	"	"	" 2	41	"	2	3	Red	"
Square Head	"	"	" 4	39	"	3	2¼	White	"
Lammas	"	"	" 2	50	"	4	3½	Red	"
Champion Prize White	"	"	" 1	38	"	4	3	White	"
Browick Red	"	"	" 3	48	"	4	3½	Red	"
Lamed Hybrid	France	Good—medium	July 30.	50	"	4	3	"	"
Dattell's Hybrid	"	Medium	" 31.	42	"	3½	2¾	"	"
Saumur	"	"	" 31.	49	"	5	3½	White	"
White Petanelle	"	Medium—poor	Aug. 1	54	"	3	3½	"	Bearded
Rietti	"	Poor	July 30.	48	Medium	½	4½	Medium	"
Red Inversible	"	"	Aug. 1	47	"	4	2½	Red	Bald

TABLE No. XII shows the results of yields, etc., of nineteen varieties of fall wheat from imported seed.

Variety.	Color of grain.	Quality of grain.	Weight of grain per measured bus.	Yield of straw per acre.	Yield of grain per acre bus. by weight. (60 lb.)	Comparative order of grain yield.
			lb.	tons.		
Galezien Summer	Red	Excellent	62⅔	2.05	32.50	1
Dividend	"	Shrunken	53	2.57	23.33	5
White Square Head	White-red	"	57½	2.22	32.08	2
One Grain Speltz		Enclosed in chaff	40½	1.92	47.33	Enclosed in chaff.
Russian Odessa			60⅔	2.05	28.33	3
Herefordshire	White	Medium	57½	1.75	23.33	5
Spalding Red	Red	Good	58½	1.33	17.08	12
Kissingland Red	"	Poor	52⅔	.60	5.00	18
Golden Drop Red	"	Medium	59¼	1.37	21.25	7
Square Head	"	"	56	1.15	15.83	13
Lammus	"	"	58½	1.75	20.00	8
Champion Prize White			57	.51	12.08	16
Browick Red	Red	Shrunken	55½	1.35	10.83	17
Lamed Hybrid	"	Medium	59	1.79	26.25	4
Dattell's Hybrid	White	Excellent	60	1.37	20.00	8
Saumur	Red	Shrunken	57½	1.37	14.16	14
White Petanelle	White	Medium	58	1.48	17.91	11
Rietti	Red	Good	59½	1.27	19.13	10
Red Inversible	"	"	59¼	1.31	13.75	15

(7) OATS, TESTING OF VARIETIES.

There were ninety-three varieties of oats tested upon the experimental plots during the year 1890. The results are in two tables; the first giving the characteristics of the growth and behavior of the various kinds; and the second table giving the yields for 1889 as well as for 1890.

The plots were one-hundredth of an acre in size, and situated in the first and second ranges of field number three on the farm. The soil was clay loam and was manured with farmyard manure at the rate of fifteen loads per acre during last winter. Seeding took place on April 22nd, and each plot was sown at the rate of two and a quarter bushels per acre.

TABLE No. XIII shows the characteristics of ninety-three varieties of Oats.

Variety.	Where obtained by O.A.C.	When obtained by O. A. C.	Years grown at O.A.C.	Date of maturity.	Length of plant, inches.	Character of head.	Amount of rust, 0 least, 10 most.	Colour of grain.	Number of kernels in one gram.	Percentage of hull in grain, 1890 crop	Percentage of kernel in grain, 1890 crop.
American Welcome	Germany	1888	2	July 4th.	.....	Spreading.	.....	White	37	31.2	68.8
California White	do	1888	2	" 11	55	Mane	2	"	50	33.0	67.0
Oderbrücher	do	1888	2	" 6	47	Spreading.	1	"	41	33.5	66.5
Thürigen	do	1888	2	" 11	51	"	4	Yellow	49	40.0	60.0
Danebrog	do	1888	2	" 9	48	"	2	White	41½	30.0	70.0
Hopetown	do	1888	2	" 10	54	"	2	"	54	32.0	68.0
Yellow August	do	1888	2	" 12	51	"	3	Yellow	56½	30.0	70.0
Longfellow	do	1888	2	" 9	62	"	2	White	39½	33.5	67.0
Probsteier	do	1888	2	" 6	50	"	2	"	44	30.8	69 2
Waterloo	do	1888	2	" 7	45	"	3	"	43	33.3	66.7
White Canadian	do	1888	2	" 10	46	"	3	"	40	29.8	70.2
Improved Besthorn	do	1888	2	" 9	41	"	3	Yellow	45	30.6	69.4
Nubian Black	do	1888	2	" 10	40	Mane	2	Black	40	33.9	66.1
August White	do	1888	2	" 9	48	Spreading.	1½	White	44	29.8	70.2
Georgien	do	1888	2	" 9	42	"	1	"	50	28.0	72.0
Providence	Sweden	1888	2	" 9	38	"	1	"	57½	31.8	68.2
Rosedale	Ontario	1890	1	" 8	45	Mane	2	"	42	34.5	65.5
Scotch Potato	Russia	1888	2	" 10	34	Spreading.	2	"	59	35.2	64.8
White Poland	do	1888	2	" 7	46	"	½	"	51	31.4	68.6
Podolischer	do	1888	2	" 4	56	"	2	"	43	38.0	62.0
Egyptian	Ontario	.....	Several.	" 7	56	"	2	"	45	26.1	63.9
Pringle's Progress	do	1889	1	" 4	48	"	1	"	39	35.0	65.0
Siberian	Russia	1888	2	" 9	54	"	1	"	44	28.3	71.7
White Tartarian	do	1888	2	" 11	54	Mane	2	"	44	34 8	65.2
Berwick White	Scotland	1888	2	" 8	46	Spreading.	2	"	55	32.0	68.0
Victoria White	do	1888	2	" 4	57	"	1½	"	43	33.6	66.4
Dun	do	1888	2	" 10	46	"	1	Dun	55	32.0	68.0
Black Tartarian	do	1888	2	" 11	42	Mane	4	Black	40	34.1	65.9
Hamilton	do	1888	2	" 10	44	Spreading.	2	White	60	34.9	65.1
Bertrum Prolific	do	1888	2	" 10	40	"	2½	"	60	34.1	65.9
White Tartarian	do	1888	2	" 15	44	Mane	3½	"	58	34.1	65.9
Black Poland	do	1888	2	" 11	44	"	3½	Black	41	35.1	64.9
Birlie	do	1888	2	" 9	42	Spreading.	2	White	58	30.7	69.3
Angus	do	1888	2	" 10	46	"	2	"	60	32.6	67.4
Longfellow	do	1888	2	" 7	42	"	2½	"	56	33.5	66.5
Hopetown	do	1888	2	" 11	52	"	3½	"	60	32.5	67.5
Potato	do	1888	2	" 10	34	"	2	"	62	38.1	61.9
Flying Scotchman	England	1888	2	" 3	59	"	1	"	43	36 5	63.5
Selected Winter	do	1888	2	" 12	51	"	2	Dun	50	36.3	63.7
Improved White Tartarian	do	1888	2	" 14	54	Mane	3	White	60	33.7	66.3
Dutch Bren	do	1888	2	" 3	51	Spreading.	1	"	48	39.4	60.6

White Tartarian	New Zealand.	1889	1	"	8	52	Spreading..	3	"	47	34.1	65.9
Improved Black Tartarian	England	1888	2	"	10	52	Mane....	3½	Black.....	49	36.3	63.7
Early Racehorse	do	1888	2	"	3	56	Spreading..	2½	White.....	47	38.8	61.2
Victoria Prize White	do	1888	2	"	5	54	"	1½	"	45	38.8	64.5
Improved Waterloo White	do	1888	2	"	9	48	"	3	"	51	37.8	62.2
Early Blossom	do	1888	2	"	5	54	"	5	"	48	38.4	61.6
Yellow Flanders	France.....	1888	2	"	11	57	"	5	Yellow.....	55	31.3	68.8
Brie Black	do	1888	2	"	14	47	"	3	Black.....	63	36.9	63.1
Egyptian	Ontario.....	.....	Several.	"	9	55	"	2	White.....	48	33.3	64.7
White Abundance	France.....	1888	2	"	7	52	"	2½	"	46	28.7	71.3
Black Red Crown	do	1888	2	"	11	43	"	2½	Black (pale)	57	30.9	69.2
Georgia White	do	1888	2	"	7	40	"	2½	White.....	48	35.1	64.9
White Hungarian	do	1888	2	"	14	53	Mane....	2½	"	60	32.1	67.5
Poland White	do	1888	2	"	7	54	Spreading..	1	"	41	28.7	71.3
Yellow Gigantic	do	1888	2	"	15	48	.....	3	Yellow	58	36.6	63.4
Colommiers	do	1888	2	"	14	50	Spreading..	2½	Black.....	61	36.8	63.2
Red spot	do	1888	2	"	5	38	"	.....	Dun.....	139	36.8	63.3
Joanette Black	do	1888	2	"	9	38	"	1	Black (pale)	51	27.0	73.0
Round or Branching Black	do	1888	2	"	10	46	"	2	"	61	38.1	61.9
Potato	New Zealand.	1889	1	"	3	61	"	.....	White.....	50	39.3	60.7
Chenailles Black	France.....	1888	2	"	8	45	"	1	Black.....	55	26.0	74.0
Black Hungarian	do	1888	2	"	13	49	Mane.....	2	"	43	34.5	65.5
Dunn	New Zealand.	1889	1	"	15	52	Spreading..	1½	Dun.....	60	37.8	62.2
Black Etampes	France.	1888	2	"	9	38	"	1	Black.....	41	26.8	73.2
Houdan Black	do	1888	2	"	9	44	"	2	" (pale)	66	28.9	71.2
Siberian	do	1888	2	"	2	50	"	1½	White.....	51	30.0	70.0
Triumph	Australia	1886	4	"	15	48	"	3½	" ...	62	51.0	49.0
White	do ...	1886	4	"	2	50	"	1½	"	44	40.7	59.3
Carter's Prize Cluster	Ontario.....	.....	Several.	"	3	53	"	2	"	43	37.3	62.7
Flanders White	France	1888	2	"	10	52	"	3½	"	47	36.3	67.4
Hopetown	Ontario.....	.....	Several.	"	9	44	"	3	"	42	33.6	66.4
Egyptian	do	.....	"	"	7	54	Mane.....	2	"	46	37.6	62.4
Racehorse	do	.....	"	"	3	50	Spreading..	2	" ...	45	37.6	62.4
Black Tartarian	do	.....	"	"	9	43	Mane	3½	"	50	36.1	63.9
Banner	do	1890	1	"	8	53	Spreading..	2	"	48	35.2	64.8
Bavarian	do	1889	2	"	8	51	"	3	"	51	37.2	62.8
White Australian	do	.....	Several.	"	14	49	Mane	3	"	48	31.8	68.2
Rennie's Prize White	do	.....	"	"	2	52	Spreading..	2	"	47	39.9	60.1
Acclimatized Black Tartarian	do	.....	"	"	11	52	Mane.....	3	Black.....	44	39.8	60.2
Pedigreed Black Tartarian	do	1888	2	"	10	53	"	3	" ...	47	38.1	61.9
Black Champion	do	... .	Several.	"	11	55	"	2½	"	52	36.5	63.5
Improved Scotch	do	.....	"	"	9	52	Spreading..	2	White.....	51	37.9	62.1
Cluster or Triumph	do	.....	"	"	4	54	"	2½	"	51	41.5	58.5
Welcome	do	.....	"	"	4	56	"	2	"	49	41.4	58.6
Early Calder	do	.....	"	"	7	49	"	2	"	57	37.7	62.3
Hungarian Black	Hungary.....	1888	2	"	9	40	Mane.....	2	Black.....	49	40.9	59.1
Port Adelaide	Australia	1888	2	"	6	54	Spreading..	2	White.....	43	39.9	60.1
Australian White	do	1888	2	"	6	47	"	2½	"	47	31.5	68.5
Prolific Black	California....	1888	2	"	7	51	Mane	3	Black.....	54	39.0	61.0
Danish	New Zealand.	1888	2	"	7	39	Spreading..	3	White.....	46	37.9	62.1
White Wonder	Ontario.....	1889	1	"	1	50	"	2	"	40	37.9	63.1

TABLE No. XIV shows the yield for ninety-three varieties of Oats for 1889 and 1890.

Variety.	Weight of grain per measured bushel.	Yield of—		Yield of grain per acre. Bushels by weight (34 lb.)			Yield of straw per acre. Tons.			Comparative order of grain yield, 2 years.
		Grain per plot.	Straw per plot.	1889.	1890.	Average.	1889.	1890.	Average.	
	lb.	lb.	lb.							
American Welcome	40⅛	15½	49½	50.	45.6	47.8	2.2	2.5	2.4	38
California White Prolific	32	15	47	47.1	44.1	45.6	3.1	2.4	2.8	45
Oderbrucher	31½	19⅜	39¼	75.0	58.1	66.6	2.6	2.0	2.3	4
Thuriugen	31½	13½	55	32.1	39.7	35.9	3.9	2.8	3.4	65
Danebrog	32	18	42	75.0	52.9	64.0	3.2	2.1	2.7	5
Hopetown	33⅛	12¾	60¼	23.5	37.5	30.5	.....	3.0	3.0	78
Yellow August	29⅝	14	57	45.6	41.2	43.4	3.9	2.9	3.4	49
Longfellow	31⅜	9	56	25.	26.5	25.8	4.0	2.8	3.4	84
Probsteier	33	18½	44½	69.1	54.4	61.8	2.9	2.2	2.6	8
Waterloo	31⅛	19⅞	44¾	64.7	56.6	60.7	3.1	2.2	2.7	11
White Canadian	33¾	19½	54½	63.2	57.3	60.6	3.1	2.7	2.9	13
Improved Besthorne	32¼	18	40	70.6	52.9	61.8	1.7	2.0	1.9	8
Nubian Black	32	17½	44½	48.5	51.5	50	3.3	2.2	2.8	32
August White	40½	14⅜	45½	41.2	43.4	42.3	3.8	2.3	3.1	51
Georgian	33⅝	19¾	43¼	63.2	58.1	60.7	3.6	2.2	2.9	11
Providence	35½	13¼	40⅜	36.8	39.0	38.0	3.3	2.0	2.7	61
Rosedale	38½	18½	45½	26.5	54.4	40.5	3.9	2.3	3.1	56
Scotch potato	34⅞	8¾	27¼	26.5	25.7	26.1	3.2	1.4	2.3	83
White Poland	34½	13¼	35⅜	44.1	39.0	41.6	3.4	1.8	2.6	54
Podolischer	39¼	16¾	49½	32.4	49.3	40.9	2.9	2.5	2.7	55
Egyptian	37½	20	46½	57.4	58.8	58.1	3.7	2.3	3.0	16
Pringle's Progress	28½	21½	48	60.3	63.2	61.8	3.0	2.4	2.7	8
Siberian	40	15¼	36¾	73.5	44.9	59.2	3.3	1.8	2.6	15
White Tartarian	35⅜	18½	43½	60.3	54.4	57.4	3.8	2.2	3.0	19
Berwick White	36	12	39	44.1	35.3	39.7	3.5	2.0	2.8	58
Victoria White	42½	17¼	42¾	55.9	50.7	53.3	2.8	2.1	2.5	25
Dunn	32	13	56	32.4	38.2	35.3	4.4	2.8	3.6	67
Black Tartarian	34½	18	42	52.9	52.9	52.9	3.9	2.1	3.0	26
Hamilton	36	12¼	44¾	30.9	36.0	33.5	3.6	2.2	2.9	71
Bertrum Prolific	35⅛	13¾	45⅜	39.8	39.0	39.5	3.6	2.3	2.5	59
White Tartarian	30⅛	15½	56½	42 6	44.9	48.8	4.5	2.8	3.7	33
Black Poland	35¼	17¼	44¾	54.4	50.7	52.4	2.8	2.4	2.5	28
Birlie	38	14¼	48⅜	25.0	41.9	33.5	2.6	2.4	2.5	71
Angus	35½	15¼	54⅜	22.1	44.9	33.5	2.3	2.7	2.5	71
Longfellow	35	14¼	49¾	29.4	41.9	35.5	3.5	2.5	3.0	66
Hopetown	33½	12½	65½	22.5	36.8	29.7	3.5	3.3	3.4	81
Potato	31½	10¼	41⅜	20.6	30.2	25.4	2.8	2.1	2.9	86
Flying Scotchman	39	18	47	63.2	52.9	58	2.4	2.4	2.4	18
Selected Winter	32¼	10¼	45¼	22.1	30.2	26.2	2.3	2.3	2.3	32
Improved White Tartarian	29½	12½	62	23.5	36.8	30.2	3.1	3.1	3.1	79
Dutch Bren	36½	16	45	47.1	47.1	47.1	2.2	2.3	2.3	41
White Tartarian	29½	13¾	46¼	32.4	40.4	36.4	.....	2.3	.....	64

Improved Black Tartarian	30	13	44½	35.3	38.2	36.8	2.2	2.2	2.2	63
Early Racehorse	40½	12¾	39¼	32.4	37.5	35.0	1.6	2.0	1.8	68
Victoria Prize White	41	15	37⅞	47.1	44.1	45.6	1.8	1.9	1.8	45
Improved Waterloo White	29½	15½	44⅝	51.5	44.9	48.2	2.0	2.2	2.1	35
Early Blossom	36¾	15¼	57⅝	60.3	44.9	52.6	2.0	2.9	2.5	26
Yellow Flanders	29⅝	10½	55	33.8	30.9	32.3	3.2	2.8	3.0	75
Brie Black	29½	13¼	64½	36.8	39.	37.9	3.4	3.2	3.3	62
Egyptian	38¼	19¼	46¾	55.9	56.6	56.3	2.7	2.3	2.5	19
White Abundance	35	19	55	61.8	55.9	58.8	2.4	2.8	2.6	17
Black Red Crown	31½	14½	68½	41.2	42.7	41.9	3.0	3.4	3.2	52
Georgia White	34½	17¼	76¾	61.8	50.7	56.3	2.6	3.8	3.2	19
White Hungarian	32½	13	60	47.1	38.2	42.7	2.7	3.0	2.8	50
Poland White	42½	15¼	42¾	64.7	44.9	54.8	1.9	2.1	2.0	22
Yellow Gigantic	27½	16½	60½	54.4	48.5	51.5	2.7	3.0	2.9	31
Coalommiers	29½	13¼	68¼	38.2	39.0	38 6	3.4	3.4	3.4	60
Red Spot	27½	9	48	35.3	26.5	30.9	2.5	2.4	2.5	77
Joanette Black	34½	21¼	60¾	80.9	62.5	71.7	2.4	3.0	2.7	1
Round or Branching Black	28½	10⅝	51⅝	35.3	32.0	33.7	2.7	2.6	2.6	70
Potato	38	14 1-5	47 3-10	54.4	41.8	48.1	2.7	2.4	2.5	37
Chenailles Black	34⅝	18	57	80.9	52.9	66.9		2.9		3
Black Hungarian	33½	16	59	45.6	47.1	46 3	2.7	3.0	2.8	43
Dun	30½	11	52	63.2	32.4	47.8	2.4	2.6	2.5	38
Black Etampes	36½	21¼	46¾	66.2	68.4	62.3	2.6	2.3	2.5	7
Houdan Black	34⅝	26	54	61.8	76.5	69.1	1.3	2.7	2.0	2
Siberian	34¾	20¾	42¼	66.2	61.0	63.6	2.1	2.1	2.1	6
Triumph	27	9	45	20.6	26.5	23.5	2.3	2.3	2.3	88
White	40½	12	43	52.9	35.3	44.1	2.3	2.2	2.2	47
Carter's Prize Cluster	40⅛	13	35	50.0	38.2	44.1	2.2	1.8	2.0	47
Flander's White	34½	13½	38	25.0	39.7	32.4	2.8	1.9	2.3	74
Hopetown	33¼	14	41½	42.6	41.2	41.9	3.3	2.1	2.7	52
Egyptian	36¾	21¼	72¾	57.4	62.5	60.0	3.0	3.6	3.3	14
Racehorse	40	11	29	48.4	32.4	40.4	2.5	1.5	2.0	57
Black Tartarian	32½	12⅛	27⅜	55.9	35.7	45.8	2.7	1.4	2.0	44
Banner	31¾	18	45		52.9			2.3		26*
Bavarian	33	15½	46⅜	72.1	44.9		2.9	2.8	2.6	47*
White Australian	32½	14⅜	48¼	64.7	43.4	54.0	2.8	2.4	2.6	22
Rennie's Prize White	39	12	43½	57.4	35.3	46.4	2.6	2.2	2.4	42
Acclimatised Black Tartarian	30¾	15½	46	61.8	45.6	53.7	2.5	2.3	2.4	24
Pedigreed Black Tartarian	31¼	15⅜	48¼	50.0	46.3	48.2	2.5	2.4	2.5	35
Black Champion	28½	16⅜	47⅞	55.9	48.5	52.2	2.7	2.4	2.6	29
Improved Scotch	30	9¼	46⅜	22.1	27.2	25.0	3.2	2.3	2.7	87
Cluster or Triumph	37	13¼	43¾	60.3	39.0	49.6	2.5	2.2	2.3	33
Welcome	37	11	41	63.2	32.4	47.8	2.4	2.1	2.2	38
Early Calder	29½	13⅜	41½	63.2	40.4	51.8	2.7	2.1	2 4	30
Hungarian Black	31⅛	13½	30½	20.6	39.7	30.2	2.4	1.5	2.0	79
Port Adelaide	39½	12⅜	30½	25.0	37.5	31.3	2.3	1.9	2.1	76
Australian White	37¼	10½	42½	20.6	30.9	25.7	2.5	2.1	2.3	85
Prolific Black	30⅜	14⅛	44⅛	25.0	42.7	33.8	2.4	2.2	2.3	69
Danish	31⅜	12¼	23⅜		36.0			1.2		65*
White Wonder	41⅜	14¼	31¼		41.9			1.6		52*

* Only one year's testing.

(8) Oats, Different Dates of Seeding.

Six plots of Bavarian oats were seeded on three different dates, two plots being seeded each time. The soil was quite uniform on the whole range, consisting of clay loam with some vegetable mould and was manured at the rate of fourteen loads to the acre in the winter of 1889. Each plot was one hundredth of an acre in size, and grain was sown broadcast at the rate of two and one quarter bushels per acre. On April 22 the Bavarian oats were sown upon a soil of clay loam, also manured last winter but situated in another field. From this plot a yield at the rate of 44.9 bushels per acre was obtained.

Table No. xv shows the yields of oats at three dates of seeding.

Dates of seeding.	Separate plots.	Duplicate tests for each date of seeding.			Average of yields for each date of seeding.		
		Weight per measured bushel.	Straw per acre, tons.	Grain per acre, bus. by weight (34 lb.)	Weight per measured bushel	Straw per acre, tons.	Grain per acre, bus. by weight. (34 lb.)
		lb.			lb.		
May 1st.....	A	29.0	1.89	34.6	30.5	2.07	30.9
	B	31.9	2.24	27.2			
May 9th.....	A	24.0	1.93	25.0	24.5	1.73	25.0
	B	25.0	1.53	25.0			
May 17th.....	A	21.0	1.68	19.1	21.5	1.66	19.1
	B	22.0	1.63	19.1			

(b) Cereals on Large Plots.

Over twenty varieties of grains were grown upon plots varying from one-third to one acre in size. These consisted of some of the most noted Canadian varieties but principally of the most promising of the 1889 crop from imported seed. The plots were made in field No. 9 of the farm, consisting of twenty acres. One half of this field received a good coating of farmyard manure in 1888 and the whole field was in corn during 1889. The manured part showed a very marked advantage in the corn crop over that part which was unmanured. During the present year the grain plots were run uniformly, so that each plot would contain one-half of the manured and one-half of that which had received no manure. The crops upon the two parts were very different in growth, that upon the manured part being taller in growth and producing more grain of a better quality. All plots were of the same length, being about forty rods long, and a path thirty inches wide was left between each two plots.

Three acres of pease, namely, the Mummy, Multipliers and Centennial were so affected by the wet weather in the early part of summer that the experiment proved unreliable for ascertaining the relative yields.

Could all these larger plots of grain have been sown about ten days earlier, we have no doubts there would have been a much larger yield, judging from the results of our smaller plots.

A description of these grains can in nearly every case be found in the tables of the smaller plots, and we will here simply give the yields per acre.

(9) Barleys, Tests of Varieties.

There are seven varieties of barley to report upon from the large plots. The land upon which these were grown, was a clay loam with a considerable amount of vegetable matter. The land was about as uniform as could be chosen for plots of such large size. The soil is so uneven over the greater part of this farm that it is very difficult to select parts which is as even as is desired for experiments. Especially when

the plots are of such a large character. The difficulty of irregularity in soil can be more fully overcome in the smaller plots where sections can be selected of a much more even nature throughout.

The first five varieties were upon plots of one-third of acre each, and the two last varieties were upon acre plots. The soil of the acre plots was lower lying than that of the other plots, and consisted of a greater quantity of vegetable matter.

Table No. xvi shows the yields of barley per acre, from plots one-third of an acre and one acre in size.

Variety.	Yield per acre (bush. by weight, 48 lb.).
Improved Scotch	30
Italian Rice	21 4-5
Phœnix	30
Kalina	26
Oderbrucher	36½
Common 6-rowed	39
Carter's Prize Prolific	31½

(10) Spring Wheats, Tests of Varieties.

There were three varieties of spring wheat tested upon acre plots, but through some cause two of these varieties were missed from the tests of the smaller plots. The soil on which these tests were made, was perhaps as uniform as any section on the farm of the same area. The difference between the part which had received manure in 1888 and that which received none was great in case of the spring wheats, the advantage being much in favor of the manured part. Could these parts have been harvested and threshed separately, it would be of much value to have the comparative figures, but pressure of work made it impossible for us to accomplish this work satisfactorily. After being well cleaned, the first two named wheats gave a yield per bushel of 62 lbs. each, and the latter 61 lbs.

Table No. xvii shows the yield on each acre.

Variety.	Yield per acre.
Red Fern	17⅓
Rio Grande	11⅔
Manitoulin	15⅓

(11) Oats, Tests of Varieties.

The oat plots were in the central part of the field and were fairly uniform throughout. There are thirteen varieties upon which to report. These were the last that were sown in the field, and were about eight days later in being put in than those on the small plots, and we observe in our tests of different dates of seeding that the same varieties put in eight days after the first seeding on April 22, gave a yield of 31 per cent less, a fact which should be taken into consideration in comparing yields of the small and large plots.

The first ten varieties were put in plots of one-third acre each and the last three in plots of one acre each.

TABLE No. XVIII shows the yields of oats per acre of 13 varieties.

Variety.	Yield per acre (bush. by weight, 34 lb.).
Black Etampes	47.1
White Abundance	33.4
Flying Scotchman	23.5
Waterloo	38.7
Probsteier	41.3
Improved Besthorn	29.3
White Tartarian	39.1
Siberian	33.4
White Poland	49.2
Danebrog	39.3
Bavarian	41.0
American Banner	45.4
White Bonanza	29.6

2. POTATOES AND ROOTS.

Upwards of one hundred varieties of potatoes and roots have been tested upon small plots during the past summer. The seed of these varieties was mostly obtained from the Canadian seedsmen and the varieties are principally those which have been grown more or less over Ontario. The plots were situated on the south-westerly slope of field 17 of the farm. This field was under grass and pastured by sheep in the summer of 1889, and was plowed lightly in August of the same year and afterwards harrowed crosswise with the Corbin disc harrow. This was again plowed before winter set in. In the spring of the present year this land received a good coating of farmyard manure, and was again plowed and afterwards harrowed and drilled up for the potatoes and roots.

(12) POTATOES, TEST OF VARIETIES.

There were twenty-eight varieties of potatoes grown upon plots one twenty-seventh of an acre in size. These plots were about twelve rods long and there were three rows in each plot. Thirty inches were allowed between each two consecutive rows and between each two consecutive plots. The land which is a clay loam had been in sod the previous year. It was plowed in the autumn, top dressed with farmyard manure at the rate of 14 loadsper acre in the spring, and again plowed. Surface cultivation then took place and the potatoes dropped into drills made with the plow. The seed potatoes were cut into pieces containing two eyes each, but owing to heavy rains was of necessity left about five days before being planted after cutting was done. The seeding took place on and as soon as the plants were nicely up, the ground was lightly harrowed. Horse hoeing took place occasionally during the growing period, and two applications of Paris green in water were made upon the tops to destroy the bugs. The potatoes were carefully taken up with a potato digger in the autumn and weighed. The crop was not large, which was perhaps principally owing to the very wet weather in the early summer.

A small sample of each variety was sent to yourself, to Mr. Forsyth, the gardener, and to myself, to test the different varieties as to their relative value for table use. These tests were all made independently of each other and reported upon as may be seen in the table. The samples sent to yourself were taken from the crop of the large plots, while those sent to Mr. Forsyth and myself were taken from small single rows in another field the soil of which was also a clay loam but of rather a lighter nature.

TABLE No. XIX shows the yields and table quality of twenty-eight varieties of Potatoes.

Varieties. (In same order in which table quality was tested).	Table Quality. Flavor. By Professor of Agriculture.	Flavor. By Foreman of Horticulture Dep.	Flavor. By Assistant Supt. Experimental Dept.	Mealiness. By Professor of Agriculture.	Mealiness. By Foreman of Horticulture Dept.	Mealiness. By Assistant Supt. Experimental Dept.	General appearance on plate.	Remarks.	Ripening.	Yield per acre, bus.	Comparative order of yield.
Early Puritan	Good	Good	Good	Good	Good	Medium	Fairly good	Somewhat above average in qualities.	Early	139½	4
Crown Jewel	Medium	"	Very good	"	Medium	Good	Medium	Above average in qualities.	"	70¾	20
Summit	"	Very good	Medium	"	Good	Medium	Whitish	Slightly above medium quality.	Late	137	6
Convoy	Very good	"	Very good	"	"	Good	"	Very fine Potato. This variety was grown in the garden.			
London	Good	"	Poor	"	Medium	Medium	Reddish white	Medium qualities.	Early	135¾	7
Rose's New Invincible	"	Poor	"	Medium	Poor	Poor	Yellowish	Poor.	Medium	78	17
The Daisy	Medium	Very good.	Very good	Good	Good	Good	Fairly White	An excellent table potato.	Early	157½	3
Clark's No. 1	"	Good	Good.	"	"	"	Medium	Good potato.	Medium	139¼	5
Green Mountain	Very good	Very good	Medium	"	"	Medium	Darkish tinge	Slightly above average qualities.	"	79½	16
Early Maine		Good	Good		Medium	Good	Whitish	Good table variety.	Early	135¾	7
Stray Beauty	Good	Poor	Poor	Poor	Poor	Medium	Yellowish	Poor table variety.	"	49	24
Empire State	"	Good		Good	Medium	Medium to good.	Whitish	An excellent table potato.	"	162	1
Beauty of Hebron	Very good	Very good	Very good	"	Good	Good	White	Extra qualities.	"	99	12
White Elephant	"	Medium	Medium	Medium	Medium	Medium	Fairly white	Medium qualities.	Late	67	23
Early Sunrise	Good	Good	"	"	Medium	"	"	Fair qualities.	Early	69½	22
Rural Blush		Medium	Poor		"	Poor	Reddish cast	Generally poor.	Late	102⅔	11
Halton's Seedling	Very good	"	Good	Good	"	Good	Medium	Good qualities.	Early	94⅔	13
Dakota Red	Good	Poor	Medium	Medium	Poor	Poor	Very solid	Poor potato.	Medium	77⅓	19
Early Ohio	Very good	Medium	"	Good	Medium	Medium	Fairly white	Medium qualities.	Early	45⅔	25
Rosy Morn	Medium		Poor	Poor		Poor	Greenish cast	Rather poor potato.	"	77⅓	18
Thorburn	Good	Very good	Very good	Good	Good	Good	Whitish	Excl't table potato.	Late	162	1
Rural New Yorker	Very good	Medium	"	"	Poor	"	Medium	Excl't table potato.	Early	129	9
Minister	Medium	Good	Very poor	"	Good	Medium	Fair	Course texture.	Late	70½	21
Pootaluck	"	Medium	Medium	Medium	Medium	"	Fairly light with a yellowish tinge	Medium qualities.	Medium	106½	10
Late Rose	Very good	Good.	Good	Good	"	"	Whitish	Fair qualities.	"	94½	14
Sweet St. Vernal	Good	Medium	Poor	"	"	Good	Medium	Medium qualities.	Late	87⅔	15
Lady's Finger											
Mrs. Foraker									Medium	25½	27

(13) Turnips, Test of Varieties.

There were in all forty-eight varieties of turnips, or rather forty-eight tests, as in a few instances the same variety appears from seed of different places. The rows were a little over eight rods long, and there were two rows of each variety. The rows were twenty-eight inches apart, and the turnips thinned to about fourteen inches in the row, or as near that distance as could be well done. Owing to the wet weather in June the turnips were not sown until the last week.

In the first table is given the results from the yellow and white fleshed turnips, and in the last table from the Swede turnips.

Table No. xx shows the characteristics and yields per acre of 16 varieties of yellow and white fleshed turnips.

Variety.	Color of flesh.	Amount of tops.	Shape of roots.	Uniformity.	Number of turnips per acre.	Average weight per root.	Yield per acre.	Comparative order of yield.
						lb.	tons.	
Pearce's Invincible	Yellow	Medium	Globe	Good	9,307	2.26	10.54	16
Purple Top Mammoth	White	"	"	Medium	13,530	3.36	15.83	9
Golden Ball	Yellow	Small	"	"	8,364	2.60	10.89	15
White Globe	White	Large	"	Good	6,847	4.56	15.62	11
Mammoth White	"	"	Elongated	"	6,068	6.64	20.15	3
Grey Stone	"	Medium	Globe	"	11,275	3.45	19.48	5
Green Top Aberdeen	Yellow	"	Elongated	Medium	8,364	3.06	12.81	14
Purple Top Aberdeen	"	Large	Globe	Poor	11,603	2.51	14.58	12
Early Six Weeks	White	Medium	Elongated	Medium	8,528	3.90	16.66	8
Waite's Eclipse Hybrid	Yellow	Large	"	Poor	10,947	2.86	15.64	10
Flat White Dutch	White	Small	Flat	"	8,323	3.50	14.58	12
White Stone or Snowball	"	Large	"	Good	8,487	4.52	19.20	6
Orange Jelly	Yellow	Medium	Globe	Medium	9,348	4.10	19.16	7
Red Top Strap Leaf	White	Small	Flat	"	9,266	4.46	20.68	2
Pomeranian White Globe	"	Large	Elongated	"	8,610	4.59	19.80	4
Red Globe Norfolk	"	"	Flat	Good	7,790	6.81	26.52	

TABLE No. XXI shows the characteristics and yields per acre of 32 varieties of Swede Turnips.

Variety.	Quantity of tops.	Neck of roots.	Uniformity of roots.	Number of roots per acre estimated from small plots.	Average weight per root.	Yield per acre.	Comparative order of yield.
					lb.	tons.	
Bangholm	Medium..	Medium..	Good.....	15354	.96	7.34	30
Laing's Swede	Small	" ..	Medium..	15826	.80	6.29	31
Green Top	Large	Short	" ..	15641	1.33	10.44	27
Skirvings	Small	"	Good.. ..	13653	1.81	12.38	24
Marquis of Lorne	Medium..	Long.....	Medium..	14555	1.43	10.39	28
Sutton's Champion	Large ...	Medium..	Good.....	15211	1.48	11.36	25
East Lothian	"	" ..	"	15149	1.70	12.85	22
Scottish Champion ..	"	Short	"	15190	1.67	12.65	23
White Swede	"	"	Medium..	8302	2.23	14.30	18
Marshall	" ..	Long.....	" ..	13919	2.13	14.82	15
Prize Winner	Small	"	Poor	18142	1.23	11.15	26
Hagard's Improved	Large ...	Short	Good.....	17753	1.68	14.95	14
Purple Top	Medium..	Long.....	" . .	18839	1.49	14.04	20
Drummond's Improved	" ..	Medium..	"	18921	1.49	14.10	19
Laidlaw's Improved ..	Small	" ..	"	19286	1.57	14.31	17
P. W. & Co. Improved Prize	Large ...	Short	Poor	17896	1.61	14.41	16
Carter's Imperial	"	Medium..	Good.....	18819	1.79	16.81	11
Elephant (Steele)	"	Long.....	"	16482	2.23	18.35	6
" (Bruce)	" ...	"	"	10251	2.52	12.92	21
Fetticairn	"	Short	"	16441	2.54	20.91	2
Marshall	Small	Medium..	"	17671	1.45	12.81	22
Rennie's Prize Purple Top	Medium..	Long.....	Poor	16851	1.87	15.79	13
Simmer's Champion	Large ...	Medium..	"	19311	1.72	16.54	12
Carter's Elephant (Simmer's)	"	Long.....	Good.....	18532	2.26	20.98	1
Royal Norfolk	"	"	"	18880	2.14	20.19	3
Hall's Westbury	"	"	Medium..	18901	2.01	19.00	4
Marquis of Lorne	Small	"	Poor	16605	2.07	16.97	10
Steel Bros. Highland Prize	Large ...	"	Good.....	19639	1.76	17.26	9
Hazard's Swede Turnip	Medium..	Medium..	"	17794	2.10	18.72	5
Homefield	Large ...	Long.....	"	18532	1.90	17.55	8
Green Top	Small	Medium..	"	17117	2.06	17.65	7
Purple Top	Large ...	" ..	"	7667	2.64	10.13	

(14) Mangels, Test of Varieties.

Twenty-nine varieties of mangels were grown upon the plots during the summer of 1890. Each plot consisted of one forty-first of an acre, the rows were twenty-eight rods apart and the mangels thinned to fourteen inches in the row. Quite full notes were taken of the growth of these roots, but owing to a misfortune we are unable to present them, and consequently only include in the table the estimated number of mangels per acre as determined from the number of mangels on the plot of one forty-first of an acre, the average weight per mangel and the yield per acre in tons.

Table No. xxii shows the average size of roots and yields per acre of 29 varieties of mangels.

Variety.	Number of mangels per acre.	Average weight per mangel.	Yield per acre.	Comparative order of yield.
		lb.	tons.	
Champion Yellow Winter	14842	1.40	10.35	20
Yellow Intermediate	11644	2.44	14.23	2
Mammoth Red Intermediate	13858	1.64	11.38	16
Imperial	17876	1.41	12.58	9
Long Yellow	13735	1.33	9.12	26
Long Red	14386	1.59	11.30	17
Norbitan Giant	16482	1.68	13 81	4
Gate Post	13571	1.72	11.66	14
Yellow Globe	13284	1.64	10.87	19
Maulen Orange	15539	1.51	11.77	13
New Giant	14596	2.00	14.62	1
Mammoth Long Red	15580	1.53	11.93	12
Carter's Golden Intermediate	9471	2.06	9.76	24
Lane's Improved	15662	1.72	13.49	5
Wane's Tankard	11767	1.12	6.58	28
P. W. & Co. Mammoth Long Red	14514	1.67	12.14	11
Yellow Globe	15539	1.62	12.61	8
Beck's Champion Yellow Globe	12792	1.69	10.30	21
Pearce's Clan Giant	16031	1.75	14.04	3
Red Globe	15375	1.62	12.42	10
Fisher Hobb's Yellow Globe	16072	1.64	13.20	6
Carter's Warden Prize Globe	12382	1.61	9.98	23
P. W. & Cc. Golden Flesh Tankard	13038	1.32	8.61	27
Red Tankard	14063	.92	6.50	29
Giant Half Long	14309	1.84	13.14	7
Giant Yellow Globe	21894	1.46	10.95	18
Dudgeon's White Sugar Beet	11972	1.60	9.65	25
Bruce's White Sugar Beet	17302	1.18	10.21	22
White Sugar Beet	15088	1.52	11.46	15

(15) Carrots, Test of Varieties.

Eleven varieties of field carrots were tested by having four rows, twenty-eight inches apart and eight rods long of each variety. The plants were thinned to from three to four inches apart in the row. Seven varieties were tested in 1889 and it is seen the Giant Short White or White Vosges has taken the lead each year.

TABLE No. XXIII shows the characteristics and yields of 11 varieties of carrots.

Variety.	Amount of tops.	Color of root.	Uniformity of roots.	Average length of carrot.	Average diameter of carrct.	Easy or hard to remove from soil.	Average weight per carrot.	Yield per acre.	Comparative order of yield.
				inches.	inches.		lb.	tons.	
Yellow Belgian	Medium	Light orange.	Medium	13½	1 5-9	Hard	.64	12.65	9
White Belgian	Large	White	Poor	12½	2	Medium	.67	16.64	3
Red Altringham	Small	Deep orange.	Medium	9	2	Medium-hard	.32	8.93	11
Intermediate	"	"	Good	8¾	2⅛	Medium-easy	.47	14.43	7
Long Orange	Large	"	"	13⅛	2⅛	Hard	.43	11.87	10
White Green Top Orthe	Medium	White	Medium	13⅛	2½	Medium	.74	16.53	4
Danvers Orange	Small	Deep orange.	Good	6¾	3	Medium-easy	.56	15.70	5
P. W. & Co. Giant Wiltshire White	Large	White	Medium	12¼	2¼	Hard	1.01	13.12	8
Peerless Orange Giant	Small	Light orange.	Good	10¼	2 4-5	Medium-easy	1.05	14.89	6
Mitchell's Perfected	Large	Deep orange.	"	9⅓	1⅞	Medium	.59	17.02	2
Giant Short or White Vosges	"	White	"	10	3¼	Easy	.85	17.78	1

3. Forage Crops.

These experiments have been mostly confined to rape tests during the past season, although a few plots were sown to lucerne in the spring of the present year. An experiment in corn cultivation will be given under the heading "Co-operative Experiments."

(c) Rape Experiments.

Until the year 1889 almost no experiments were ever conducted in connection with rape cultivation in Ontario. Owing to the growing importance of this crop for feeding lambs in the autumn and early winter, a number of experiments have been conducted upon the experimental plots for the past two years.

In harvesting the rape knives were used and the plants were cut off on a level with the ground, and consequently the yield will be lighter than last year when the roots and tops were weighed together.

(16) Influence of Salt with Rape on Four Kinds of Soil.

About seven years ago a plot was formed in the central part of the experimental field for the purpose of testing four kinds of soil under as near the same conditions as could be obtained. The whole plot is eight rods long by two rods wide, and is divided into four portions, each being two rods square. The soil is well supplied with tile drains. One end of the plot is a natural muck. The surface soil of the two central plots was removed to a depth of two feet and then one was filled with clay of a rather heavy nature and the other with marl intermixed with loam, while the remaining portion, being naturally a good clay loam, was left untouched.

In the spring of 1888, each portion was divided into two equal parts, and boards placed edgeways in the ground at the division and extended from one end of the plot to the other.

The accompanying diagram will illustrate the position of the soils and the divisions :

SALT.	SALT.	SALT.	SALT.
LOAM.	MARL.	CLAY.	MUCK.
NO SALT.	NO SALT.	NO SALT.	NO SALT.

The treatment of the plot throughout was similar until the spring of 1888, when salt was applied at the rate of 400 lb. per acre on the soils of one side of the division through the centre, while the remaining half of each soil was left without salt. Barley was sown upon the whole plot and results presented in the College Report of 1888. In the spring of 1889 salt was again applied at the rate of 400 lb. per acre upon the same portions as in 1888 and oats sown over the whole plot.

In the summer of the present year rape was sown upon these plots in drills twenty-two inches apart. No addition of salt was made and the result of the rape experiment shows the influence of salt in the second year's crop after application. The rape was thinned to about five inches apart in rows.

The results of crops for the last three years are given in the table, as they are very interesting and also of much practical value.

TABLE No. XXIV shows the results of crops grown upon four kinds of soil, with and without the application of salt, for the past three years.

	Salt or no salt.	1888. Yield of barley.		1889. Yield of oats.		1890. Yield of rape.	Yield per acre.		
		Grain, per plot.	Straw, per plot.	Grain, per plot.	Straw, per plot.	Rape, per plot.	1888. Barley.	1889. Oats.	1890. Rape.
		lb.	lb.	lb.	lb.	lb.	bus.	bus.	tons.
Loam	Salt	21¼	23¾	23½	58	236	35½	55⅕	9.45
	No salt	21	21½	22¾	50	164	35	52⅕	6.56
Marl	Salt	11¼	36¼	16¼	68¼	168	18¾	38¼	6.72
	No salt	10½	31½	15½	41	98	17½	36½	3.92
Clay	Salt	16¾	15¼	20½	57½	70	28	48¼	2.81
	No salt	12¼	17¾	17½	45	60	20½	41⅙	2.40
Muck	Salt	11¼	15¼	.....	.....	119	18¾	.....	4.77
	No salt	7	20	.....	.....	107	11⅔	.....	4.28

(17) RAPE UPON FLAT AGAINST RIDGED LAND.

Twelve plots of rape were grown upon land, one-half of which had been previously drilled up and one-half of which had been left level. Seed was sown at the rate of four lb. per acre, and after coming up the young growth was treated as follows:—Two plots in each half were left untouched; two plots in each half were thinned so that the rape plants stood on an average of four inches apart; and the remaining two plots upon each half were thinned so that the plants were six and one-half inches apart. The rows were twenty-two inches apart, and the same cultivation was given the various plots throughout the season.

TABLE No. XXV shows the average of duplicate results from growing rape upon ridged and flat soil, with planting thick and thin.

Cultivation.	Thinnings.			Average yield per acre. lb.
	¾ inch apart.	Thinned to 4 in. in row.	Thinned to 6½ in. in row.	
	Yield per acre. lb.	Yield per acre. lb.	Yield per acre. lb.	
Ridged land	9855	7245	8460	8520
Level land	12105	10530	7650	10095

(18 FERTILISERS UPON RAPE.

Twenty-four plots were grown with rape and salt superphosphate, dried blood and scrap, sodium nitrate and fresh wood ashes were applied in varying quantities, and both to the plant and to the soil, but as the conclusions might be somewhat misleading as the tests were not made in duplicate, it seems best to merely present the average of the four plots

with each fertiliser, and also the average of the four plots with no manure. The fertilisers were applied when the plants were about one-third grown, and the crops were cut off even with ground in harvesting and carefully weighed.

TABLE No. XXVI shows the yields of rape per acre in lbs. from the application of fertilisers.

Fertiliser.	Quantity of fertiliser per acre.	Yield of rape per acre estimated from average of 4 plots in each case.	Fertiliser.	Quantity of fertiliser per acre.	Yield of rape per acre estimated from average of 4 plots in each case.
	lb.	lb.		lb.	lb.
Salt	300	17370	Sodium nitrate	150	20025
Superphosphate	300	16223	Fresh wood ashes	750	16223
Dried blood and scrap	300	18068	No fertiliser		16088

(19) RAPE THINNED TO DIFFERENT DISTANCES WHEN GROWING.

Twelve plots were sown with rape in ridges twenty-two inches apart, and with seed at the rate of four pounds to the acre. These twelve plots were divided into six sets, with two plots in each set. The rape on each of the plots in No. 1 set was thinned so that the plants averaged fifteen inches in the row; No. 2 set, twelve inches in the row; No. 3 set, nine inches in the row; No. 4 set, six inches in the row; and No. 5 set was left unthinned. The thinning did not take place until the plants were about one-third grown, and perhaps had it been done earlier in the season each plant might have made greater development by having more room.

TABLE No. XXVII shows results from different thinnings.

Distances apart of plants in row.	Yield of rape per acre in pounds. Estimated from plot.		
	Test No. 1.	Test No. 2.	Average.
15 inches	5250	5760	5505
12 "	6000	6900	6450
9 "	6540	8100	7320
6 "	10200	10680	10440
Unthinned, seed at 4 lbs. per acre	27633	27120	27376.5

(d) Permanent Pasture Grasses.

A number of grasses have been grown upon the experimental plots for a number of years, both singly and as mixtures. The object in Ontario should be to pasture as much stock on land devoted to pasture each year as possible, with the partial soiling and ensilage systems, which are coming in use so much at the present time, a smaller area of pasture land is needed than formerly, but this should be of the best that can be obtained.

A considerable portion of the seeding on this farm is now done with a mixture of grasses and clovers, even when intended to stand for only two or three years. The grasses which would stand well here might do well in many other localities over Ontario. We will very briefly notice some of the English grasses as grown by us a number of years and observe their hardiness of each.

(20) Grasses grown singly.

Grasses were sown singly upon plots one-twentieth of an acre in size in the spring of 1883. The soil was a mild clay loam with a considerable quantity of vegetable matter. The crop has been mostly cut with the horse mower for hay, but has also been pastured off by sheep. Some of the grasses have completely disappeared while others are holding out remarkably well.

Table No. xxviii shows the results of the eighth season's test of grasses sown singly upon plots.

——	Durability for eight years.	Remarks.
Meadow Foxtail	Holding well	Earliest of all the grasses.
Timothy	Disappeared	Gone in about three years.
Perennial Rye	"	" " " "
Italian Rye	"	" " two "
Wood Meadow Grass	Holding well	Close matting of fine grass.
Rough stalked meadow grass	" "	" " " "
Various leafed Fescue	" "	Grows to about 23 inches, a little bunching.
Sheep's Fescue	" "	" " 20 " fine wiry leaf.
Hard Fescue	" "	" " 18 " very thick mat.
Fine leafed Fescue	Medium	" " 12 " very bunchy.
Large leafed Fescue	Nearly gone	Strong plants growing here and there.
Tall Fescue	Medium	Grows to about 36 inches, few heads.
Red Fescue	Holding well	" " 11 " short and thick.
Sweet Vernal	Disappeared	Gone in second year.
Crested Dog's Tail	"	" " "

(21.) Grasses Grown in Mixtures.

A number of plots have been sown with mixtures for the last eight years, there being one, two or more plots put in nearly every year. From several years' observations the following varieties are the most reliable for this locality:

Meadow Foxtail,
Orchard Grass,
Kentucky Blue,
Meadow Fescue,
Tall Oat,
Wood Meadow Grass.

A number of the fescues are also very hardy, but are much finer in growth. The first four varieties named, along with red and alsike clovers, would make an excellent pasture for three or four years or more, and if the crop were carefully handled would make a large amount of good hay. We took this year 3.86 tons of fine hay from two acres of grass land seeded with a mixture in 1886 and which has been pastured very heavily since that time.

It is found to be the best to seed in the spring of the year, as some of the young and tender grasses are liable to become destroyed during the first winter, unless they get a good rooting the year before.

4. Co-operative Experiments.

During the past few years some very interesting and valuable experiments have been conducted over the province by members of the Ontario Agricultural and Experimental Union and other leading agriculturists. The principal object has been to obtain a better practical knowledge of some of the most easily procured Canadian fertilisers. The Union has forwarded from the experimental department of the institution material for the tests, free of charge, to those desirous of undertaking the experiments, and the very enthusiastic manner in which this work has been taken hold of by college associates and others has almost surpassed our expectations. The number of experiments has become greater each season, and the number of those carrying on the tests has increased about eight fold during the last three years. It has been my aim from the very commencement of this co-operative work in 1886 to give all the assistance and encouragement possible to this line of work, knowing the great advantage of these experiments to those who conduct them, and also to the whole farming community. With a soil and climate so varied as we have over the province of Ontario it is very evident that experiments conducted with fertilisers, newly-imported cereals, different modes of cultivating corn, etc., are much limited in their value as close guides for the majority of farmers of Ontario. I have been looking forward for the past three years with the expectation that in the near future this all important co-operative experimental work would be placed upon a more elaborate system of operation; that there would not be individuals engaged at this work alone, which they have been doing at their own expense, but that there may be a number of branch experiment stations over this agricultural country. Surely there need be no greater evidence of the need of branch stations than the enthusiastic manner in which the members of the Experimental Union have been engaged at these co-operative experiments. This plan of branch station work is being carried into effect in several of the American states with much success, and who can doubt but it would meet with equal success in our own land and be of inestimable value to the farmers of Ontario.

The following is the front page of a circular sent to experimenters over Ontario during the past spring. Instructions and blank forms for the experiments made up the remaining part of the circular.

Ontario Agricultural and Experimental Union.

Guelph, March 1st, 1890.

Dear Sir,—Experiments carefully carried on have done much towards improving the methods of farming. With this fact in view the Ontario Agricultural and Experimental Union has been carrying on co-operative experiments from year to year, which have been gradually growing in importance and value. Those proposed for this year's work should

be appreciated by every farmer. If you can give the small amount of time and careful attention required to carry on one or more of these tests, you will be amply repaid for the trouble taken by yourself by the conclusions arrived at on your own farm. You will also have the benefit of the results of similar experiments conducted in different parts of the province, all of which, when carefully carried out, will be presented at the annual meeting of the Association, and afterwards entered in the annual Report of the Union, a copy of which will be sent to each experimenter.

The experiments for this year are as follows :

(1) A continuation of the test with superphosphate, dried blood and scrap, farmyard manure, and no manure, with oats, applied without additional fertiliser.

(2) New plots with superphosphate, dry blood and scrap, farmyard manure, and no manure with oats.

(3) Application of sodium nitrate to either spring wheat or fall wheat, to be applied in the spring at the rate of 200 lbs. per acre.

(4) Testing new varieties of cereals.

(5) Different modes of cultivating corn similar to 1889.

(6) The growing of lucerne.

Full particulars for carrying out the above experiments are contained in this circular.

Fertilisers and seeds required for the tests will be sent free of charge to your nearest express office.

The materials for Nos. II., III., V. and VI. being expensive, only a limited number of these can be sent out. Those applying first will of course have the preference.

If you are in a position to carry on one or more of these experiments, kindly let us know by the 25th instant which test or tests you prefer, mentioning your nearest express office, so that the materials shall reach you in time.

Kindly forward all communications regarding experiments to C. A. Zavitz, O. A. College, Guelph, by October 20th, 1890.

Yours sincerly,

AGRICULTURAL COMMITTEE.

The material and instructions for the different experiments and the blank forms on which to return reports were sent from here during the spring of the year just closing, partly at the expense of the Experimental Union and partly at the expense of the Experimental Department of this institution, The following is the number of plots for which material was sent to those experimenting.

Experiment	No.	I.	No additional fertiliser required.	
"	"	II.	48	plots.
"	"	III.	34	"
"	"	IV.	170	"
"	"	V.	44	"
"	"	VI.	58	"

The greater number of the results from the summer's work are now received, and when they are all to hand, will be summarized and presented at the annual meeting of the Association in February next.

We feel it not only a duty but also a pleasure to here give a list of those ex-students and other farmers who have taken hold of this work during the past season. Experimental work of this kind takes considerable thought and care, and some extra labor to carry it on properly, and we think much credit is due to those who have sent in good reports in the past. The reports of the present season give indications of surpassing

all those of the previous years. From letters received we are led to believe that much advantage has been derived by the experimenters themselves in obtaining a better knowledge of their own soil and its requirements, and the results of all the experiments when summarized will be made to add valuable matter to the collected reports of the Union of the four previous years, as presented in the annual report of the association.

The following is a list of experimenters for 1890 :—

Names of experimenters.	Counties.	Names of experimenters.	Counties.
Alexander, R. C	Middlesex.	Lett, R	Renfrew.
August, William	Dufferin.	Lick, E	Ontario.
Ballantyne, W. W	Perth.	Marsh, G. F	Grey.
Birdsall, F.	Hastings.	Mattice, G. L	Stormont.
Birdsall, W. G.	"	McKay, J. E	Bruce.
Birdsall, William	"	McMartin, D. A	Stormont.
Bowman, C. D.	Waterloo.	McNiven, W. J	Bruce.
Bristow, G. B	Grey.	Monteith, N	Perth.
Brown, P. J	Digby.	Morgan, R	Middlesex.
Brown, R. M	Grey.	Moyer, D	Lincoln.
Burwash, H. A.	Bruce.	Mowbray, William	Lambton.
Buchanan, William	Huron.	Muir, J. B	Bruce.
		Muma, J	Middlesex.
Cameron J. M	Hastings.		
Carruthers, P	Haldimand.	Nancekivell, W	Oxford.
Christy, G. V	Prince Edward.		
Clapp, W	"	Pike, L	York.
Cousineau, J. B	Ontario.		
Cuppage, J.	Simcoe.	Quinn, William	Victoria.
Dawson, H.	Wellington.	Raynor, T	Prince Edward.
Drummond, J. M	Peterborough.	Redmond, J.	Peterborough.
		Reed, D.	Wentworth.
Farlinger, F. E	Dundas.	Rendall, William	Grey.
Flemming, F. A	York.		
		Shuh, F.	Ontario.
Goldthrop, W. M	Muskoka.	Sherriff, G. G	Russell.
Grant, R. S	Haldimand.	Smith, E. P	Durham.
Grey, J	Peel.	Smith, J. D	"
Guest, J	Simcoe.	Snyder, G.A	Lincoln.
		Sprague, J. A.	Prince Edward.
Hartman, W.	Grey.	Stone, J. B	Northumberl'd.
Henry, J.	Simcoe.		
Hodge, G. F	Ontario.	Varcoe, J. A. S	Huron.
Hunter, J	Lambton.		
		Walker, E	Muskoka.
Job, J. R.	Wentworth.	Walker, S	Huron.
Jeffs. H. B.	Simcoe.		
		Zavitz, E. M	Middlesex.
Kennedy, J	Lincoln.	Zavitz, William	"
Kitchen, B. E	Norfolk.		

As the details and summaries of the union experiments as conducted during 1889 and presented at the last annual meeting of the association are enclosed in the thirteenth annual report of the association, which is embodied in the latter part of this volume, but little will be given here of the results. Two experiments conducted the present year by the experimental department, and which are not recorded elsewhere, will be here given

(22) Superphosphate, Dried Blood and Scrap, Farmyard Manure, and no Manure with Oats.

Instructions for No. II. Experiment as sent to each Experimenter.

(1) Select a piece of ground of same nature throughout, and representative as far as possible of the land of the neighborhood. Avoid naturally rich soils or those which have

had recent applications of manure or special cultivation. Keep clear of wet spots, trees, fences and buildings. Give cultivation to experimental plots similar to that of your larger fields. *An advantage would be gained if the plots could be chosen in such a position that they could remain for experiment another year.*

(2) Mark off four plots of one-fortieth of an acre each, leaving a clean path two feet wide between the plots. Two rods square is a convenient shape.

(3) Submit all plots to same treatment, and sow one-fourth of grain sent on each Aim at seeding one inch deep.

(4) Apply the superphosphate sent to plot No. I.; the dried blood and scrap sent to No. II.; the farmyard manure to No. III., and leave No. IV without any manure. The fertilizers to be sown at the time of seeding.

(5) Keep plots at all times clear from trespassing by poultry, etc.

(6) Aim at sowing 700 lb. farmyard manure on No. III. plot (14 tons per acre)

(7) If it is your wish to carry on this experiment, please inform the Secretary, as named on front page, naming your nearest express office, and there will be sent to you, expressage prepaid, 7½ lb. ... .oats; 10 lb. superphosphate for plot No. I., and 10 lbs. of dried blood and scrap for plot No. II.

(8) Fill out blank form and return according to directions on front page. NOTE.—The price of the superphosphate is about $30 per ton, and the dried blood and scrap $40 per ton.

TABLE No. XXIX shows results of Fertiliser test upon Experimental plots, 1890.

Fertiliser.	Yield of straw, tons per acre.	Yield of grain, bus. per acre.
Superphosphate, 400 lb. per acre..	.830	15.29
Dried blood and scrap, 400 lb. per acre.....	.990	15.29
Farmyard manure, 14 tons per acre.....	1.243	15.44
No manure..... ...	.685	11.78

(23) DIFFERENT MODES OF CORN CULTIVATION.

Instructions for No. V. Experiment, as sent to each Experimenter.

(1) Select a piece of ground of same nature throughout, under same conditions, and representative as far as possible of the land of the neighborhood. Avoid naturally wet spots, and keep clear of trees, fences, and buildings. Prepare the ground as you would a large field for the same crop.

(2) Mark out four plots of one-tenth of an acre each, allowing a clean path between the plots. Four rods square is a convenient shape for each plot.

(3) Sow the corn received in the following manner:

No. I plot—Drills of equal distance apart (as near 3½ feet as possible) with seed averaging two grains to the foot.

No. II plot—Drills of same distance apart as No. I, with seed averaging 12 grains to the foot.

No. III plot—Broadcast or close drills with seed averaging one-half bushel per acre (2.8 lbs. per plot.)

No. IV plot—Same as No. III with seed averaging three bushels per acre (16.8 lbs. per plot.)

(4) Aim at having the seeding all done in one day, and not later than 15th day of June. NOTE.—Shallow planting for early seeding, and deeper planting if late enough for soil to be warm.

(5) Give plots I and II the same amount of after cultivation, as often as you think they need it, but avoid mounding the rows; shallow cultivation is preferred.

(6) Cut each crop at the time when its condition corresponds to the roasting condition of field corn, or when the ears are in the glazed state.

(7) Weigh produce from the plots when under as equal conditions as possible. NOTE.—If you can observe the comparative results from the feeding of the different lots please send information under head of "Conclusions" in blank form.

(8) Fill out accompanying blank form and return according to directions on front page.

TABLE No. XXX shows the result of Corn test upon Experimental plots, 1890.

Seeding and cultivation of crop.	Yield per acre, tons.
Wide drills, 2 grains per foot	16.87
Wide drills, 12 grains per foot	15.60
Broadcast or close drill, 2.8 lbs. per plot (one-half bushel per acre)	10.37
Broadcast or close drill, 16.8 lbs. per plot (three bushels per acre)	19.32

II.—LIVE STOCK EXPERIMENTS.

(24) CORN ENSILAGE AS A FOOD FOR MAKING BEEF.

An experiment on the fattening of steers with ensilage and meal; ensilage, hay and meal; and roots, hay and meal, was conducted in the early part of the present year.

Six grade steers, which had been bought by the farm department on October 19th, 1889, were used for the experiment. They were all slightly over three years old when the experiment was commenced. From the time the animals reached the farm until the test started they were kept under the same treatment and food until the last week, when they were divided into three groups, of two animals in each group, and fed their respective rations as a preparation for the experiment.

TABLE No. XXXI shows the breeding of the animals in each group and the quantity of food which we purposed to give each animal of each group, as nearly as the peculiarities of the several animals would allow.

Breeding.	Group I.		Group II.		Group III.	
	1	2	1	2	1	2
	S. H. grade.	S. H. grade.	S. H. grade.	S. H. grade.	Pure S. H.	S. H. grade with touch of Ayrshire blood.
Daily average quantity of food per animal aimed at in the experiment.	Ensilage, all that would be eaten.		Ensilage, 45 lbs.		Roots, 45 lbs.	
	Meal, 12 lbs.		Hay, all that would be eaten cleanly.		Hay, all that would be eaten cleanly.	
			Meal, 12 lbs.		Meal, 12 lbs.	

The experiment proper was commenced on Dec. 31st, 1889, with the two animals of each group in a double stall. Feeding took place at 5 a. m., 11 a. m. and 5 p. m., and watering at 8 a. m., 1 p. m. and 4 p. m. Grooming was done five times weekly. The stable in which the animals were kept was comfortably warm, there being almost no frost present throughout the experiment.

The following notes are upon the character of food given :—

Ensilage.—The ensilage was made from fodder corn, and was of excellent quality for the first seven weeks after which time it was not as good owing to the corn being more immature when put in the silo.

Roots.—The roots consisted of turnips which were pulped, and mixed with the other feed.

Hay.—The hay consisted of timothy and clover in about equal parts. The hay was only medium in quality.

Meal.—The meal consisted of equal parts by weight of peas, barley and oats.

The different constituents of the feeding ration were all mixed together before feeding, and everything excepting bedding and water was weighed before being put before animals and the refuse left over if any was again weighed, before more feed was given.

The experiment commenced on Dec. 31st, 1889, and closed on April 29th, 1890, thus making in all 119 days.

Table No. xxxii shows the weight of each animal during each week of the experiment.

Dates.	Group I.		Group II.		Group III.	
	Steer No. 1.	Steer No. 2.	Steer No. 3.	Steer No. 4.	Steer No. 5.	Steer No. 6.
December 31st	1,515	1,327	1,469	1,393	1,477	1,341
1st week	1,533	1,328	1,477	1,390	1,485	1,371
2nd "	1,517	1,331	1,504	1,375	1,527	1,401
3rd "	1,536	1,343	1,484	1,411	1,488	1,369
4th "	1,559	1,352	1,512	1,412	1,523	1,400
5th "	1,584	1,369	1,531	1,434	1,547	1,418
6th "	1,591	1,377	1,540	1,443	1,539	1,420
7th "	1,613	1,405	1,561	1,457	1,581	1,432
8th "	1,627	1,391	1,578	1,479	1,591	1,449
9th "	1,642	1,420	1,577	1,498	1,605	1,478
10th "	1,669	1,431	1,617	1,514	1,610	1,475
11th "	1,671	1,429	1,614	1,529	1,618	1,489
12th "	1,671	1,433	1,622	1,541	1,645	1,494
13th "	1,697	1,446	1,634	1,543	1,642	1,506
14th "	1,701	1,461	1,644	1,565	1,649	1,507
15th "	1,718	1,487	1,664	1,586	1,651	1,483
16th "	1,759	1,515	1,680	1,600	1,675	1,510
17th "	1,762	1,520	1,691	1,613	1,696	1,526
Total increase per animal, 119 days	247	193	222	220	219	185
Total increase per group, 119 days.	440		442		404	
Average daily increase per group, 119 days	1.847		1.857		1.697	

The food was all eaten up cleanly except the ensilage of which there was an average of 18 lb. left for each animal of the first group, and an average of 13½ lb. for each animal of the second group. This, however, was given to other animals not under experiment, and was nearly all eaten by them.

TABLE No. XXXIII shows the amount of each kind of food given to each animal for the separate weeks of the experiment.

Weeks of experiment.	Group I.				Group II.						Group III.					
	Steer No. 1.		Steer No. 2.		Steer No. 3.			Steer No. 4.			Steer No. 5.			Steer No. 6.		
	Meal.	Ensilage.	Meal.	Ensilage.	Meal.	Ensilage.	Hay.	Meal.	Ensilage.	Hay.	Meal.	Roots.	Hay.	Meal.	Roots.	Hay.
1st week	84	525	84	525	84	315	63	84	175	63	84	315	84	84	315	84
2nd "	84	525	84	525	84	315	63	84	175	63	84	315	84	84	315	84
3rd "	84	588	84	525	84	315	63	84	315	63	84	315	84	84	315	84
4th "	84	588	84	525	84	315	63	84	315	63	84	315	84	84	315	84
5th "	91	588	91	525	91	315	84	91	315	84	91	315	98	91	315	98
6th "	91	588	91	525	91	315	84	91	315	84	91	315	126	91	315	98
7th "	91	588	91	525	91	315	84	91	315	84	91	315	126	91	315	98
8th "	91	588	91	525	91	315	84	91	315	84	91	315	126	91	315	98
9th "	91	588	91	525	91	315	84	91	315	84	91	315	126	91	315	98
10th "	91	588	91	525	91	315	84	91	315	84	91	315	126	91	315	98
11th "	91	588	91	525	91	315	84	91	315	84	91	315	126	91	315	98
12th "	91	588	91	525	91	315	84	91	315	84	91	315	126	91	315	98
13th "	91	588	91	525	91	315	84	91	315	84	91	315	126	91	315	98
14th "	91	588	91	525	91	252	84	91	252	84	91	210	105	91	210	84
15th "	91	588	91	525	91	252	84	91	252	84	91	210	105	91	210	84
16th "	91	588	91	525	91	252	84	91	252	84	91	210	105	91	210	84
17th "	91	588	91	525	91	252	84	91	252	84	91	210	91	91	210	84
Total food given to animals, 119 days	1,519	9,970	1,519	8,925	1,519	5,103	1,344	1,519	4,823	1,344	1,519	4,935	1,848	1,519	4,935	1,554
Average daily food given to each animal, 119 days	12.7	83.8	12.7	75	12.7	42.9	11.3	12.7	40.5	11.3	12.7	41 5	15.5	12.7	41.5	13.1

TABLE No. XXXIV shows the average amount of daily food given to each animal.

Feed.	Group I.	Group II.	Group III.
Meal	12.7	12.7	12.7
Corn Ensilage	79.4	41.7	
Roots			41.5
Hay		11.3	14.3

The estimated value of steers on December 31st, 1889, was 57.50 or 4¼ cts. per lb. The value of feed for the period was meal, ⅞ cents per pound; corn ensilage, $2.50 per ton; roots, 8 cents per bushel; and hay, $6.50 per ton. These valuations were taken from Guelph market prices with exception of corn ensilage and roots.

TABLE No. XXXV shows the average increase in the weight of the animals of each group.

——	Group I.	Group II.	Group III.
Average weight at commencement	1421	1431	1409
Average weight at close	1641	1652	1611
Average total gain	220	221	202
Average daily gain	1.847	1.857	1.697

The steers were sold on May 16th, at 5¾ cents per pound live weight, after the animals were lying in the yard all night without food, and weighed at 8 a.m. the following morning.

Weight before fasting	10,149 lb.
" after 12 hours fast in yard	9,763 "
Loss in weight	386 "

(25) FATTENING LAMBS.

An experiment in which forty-eight lambs were fed for two months upon rape in the field and for two months upon dry fodder in the shed, was commenced on October 10th, 1889, and closed on February 10th, 1890. The lambs were purchased just before the experiment was commenced and were weighed on October 10th.

TABLE No. XXXVI shows where the lambs were obtained, the number in each lot, price paid, the weights of the different lots on October 10th and the cost per hundred.

Lambs bought October, 1889, from	Number of lambs.	Price paid per head.	Total cost.	Total weight.	Cost per hundred.
		$ c.	$ c.	lb.	$ c.
Auld	20	3 95	79 00	1,920	4.11 11-24
Jerow	7	4 00	28 00	658	4.25 13-22
Anstie	8	3 37½	27 00	687	3.93 3-22
Rennie	13	3 90	50 70	1,347	3.76 7-18

The lambs were nearly all Coltswold and Oxford-Down grades, but a few Leicester and Shropshire grades were among the number. The rape field contained eight acres, and the lambs were unable to eat more than about one-half of the crop when they had to be removed on December 3rd on account of severe weather.

Weight of 48 lambs on October 10th	4,612 lb.
" 48 " December 10th	5,476 "
Gain of 48 lambs in the 62 days of the experiment	864 "

The lambs were kept in the shed from December 10th, 1889, until February 10th, 1890, and all the food given them was very carefully weighed and noted except the hay, which could not well be done. They received of sliced turnips 85 bushels and of whole oats 31 1-10 bushels. During the last part of the experiment one lamb was found lying on its back dead.

Weight of 48 lambs on December 10th, 1889	5,476 lb.
" 47 " February 10th, 1890	6,020 "
Gain of 48 lambs for 59 days (less a 140 lbs., lamb which died).	544 "

The price received for the lambs on March 14th and 22nd was $5\frac{3}{4}$ cts. per lb. Thus the results would be as follows :—

Cost of 48 lambs on October 9th, 1889	$184 70
Price realised for 47 lambs on March 14th and 22nd	370 30
Total gain	185 60

(26). Corn Ensilage and Roots as Food factors in Swine Feeding.

An experiment was conducted with store pigs averaging 204.5 lb. each, for the purpose of gleaning some information as to the value of corn ensilage and of roots as factors in the economical feeding of swine. The experiment was commenced on January 10th, 1889, and closed on March 28th, 1890, making in all a duration of 77 days.

Table No. xxxvii shows the division of the animals into groups and the quantities of food which were to be fed as far as circumstances would allow.

Animals in experiment.	Number of each group.	Animals in each group.	Class of Animals	Amount of feed eaten by animals in each group.
9	1	1	Barrow	All the meal they would eat without waste.
		2	Small sow.	
		3	Large sow.	
	2	1	Barrow	One-third as much meal as was given to group No. 1, mixed with all the sliced turnips they would eat.
		2	Small sow.	
		3	Large sow.	
	3	1	Barrow	One-third as much meal as was given to group No. 1, mixed with all the corn ensilage they would eat.
		2	Small sow.	
		3	Large sow.	

The animals were from three litters, there being a representative from each litter in each group. Two weeks were allowed after the pigs were placed in their respective pens and the feeding ration of the experiment was first given, as a preparatory period. The meal consisted of one part wheat middlings, one part each of oats and peas ground, and two parts of pea meal, all mixed together. The meal was always mixed with water in the trough at time of feeding. The roots consisted of sliced turnips, which were sprinkled with the meal before being fed. The ensilage was made from fodder corn, and was of very good quality, considering the corn had been somewhat immature when cut. The meal was also mixed with the ensilage before given to the pigs.

TABLE No. XXXVIII shows the weight of each group of animals at the commencement and at the close of the preparatory period.

Group.	Weight at commencement.	Weight at close.	Average gain or loss.
1	618.5	655.5	37
2	583.5	595.5	12
3	602.5	590.5	-12*

*The pigs in No. 3 group did not eat the ensilage well at the commencement.

TABLE No. XXXIX shows the average amount of food given per day to each group of animals throughout the experiment.

Group.	Meal.	Roots.	Ensilage.
1	16½ lb.	5½ lb.	5½ lb.
2	.....	60 "	.....
3	.....	.....	35 lb.

The feed of each group was eaten up without waste except the ensilage of group No. 3 which was only partly eaten, but was all picked over and chewed up.

TABLE No. XL show the weekly weights of each animal throughout the experiment.

	Group I. (Meal.)			Group II. (Meal and roots.)			Group III. (Meal and ensilage).		
	Barrow.	Small sow.	Large sow.	Barrow.	Small sow.	Large sow.	Barrow.	Small sow.	Large sow.
January 10th	251	212.5	192	203	200	192.5	201½	212½	176½
1st week	265	217	199	216	210	204	206	215½	182
2nd "	273.5	231	207	218.5	214	206	209	219	186
3rd "	282	233	215	221	216	206	212	221	187
4th "	290	251	226	227	221	211	213	224	189
5th "	300	261	234	227	232	214	217	224	193
6th "	300	268	238	237	226	215	219	225	194
7th "	312	279	249	245	234	228	223	230	199
8th "	319	273	250	248	237	223	225	226	199
9th "	331	287	262	252	236	224	224	227	193
10th "	341	300	271	260	243	231	229	230	203
11th "	347	306	273	263	246	226	232	229	210
Total weight at close of experiment		926.5			736.5			671	
Total increase during the experiment		270.5			139.5			80.5	
Daily average increase		1.170			.604			.348	

The experiment proper was closed on March 28th, at which time the animals of group I. were sold for 5¼ cents per pound, live weight. The other six pigs were fed for 41 days longer upon a ration of meal similar to the one given before, of which an average of 22 lb. was eaten daily by each group. The daily increase for this period was as follows :—Animals in group No. II 1.58 lb. and animals in group No. III 1.95 The six pigs were sold on May 9th at 5¼ cents per pound live weight.

(27) Feeding Swine on Grain and Meal.

An experiment was conducted with pigs, averaging about 50 lb. each, to test the value of a meal mixture composed of ground peas two parts, ground oats one part, ground barley one part and wheat middlings one part; against a ration of peas and barley in equal quantity ground, and peas and barley in equal quantity whole. The experiment was commenced January 17th, and ended May 31st. The respective rations were given to the groups one week before the experiment started for a preparation period, previous to which time they had been fed similarly for twenty-nine days.

Table No. xli shows the arrangement into groups and some features relating to both the animals and the food given.

Groups.	Breed.	Date of farrowing.	Class of animal.	Food rations.	Preparation of food.	Manner of giving water.
		1889.				
I.	3 Berkshire grades....	Oct. 4..	2 barrows. 1 sow	Peas, 2 parts ..... Oats, 1 part ..... Barley, 1 part..... Wht. middlings, 1 part.	Ground grain...	Meal and water mixed.
	1 Pure Berkshire	Sept. 13..	1 sow..			
II.	3 Berkshire grades....	Oct. 4..	2 barrows. 1 sow	Peas, 1 part ..... Barley, 1 part	Ground grain...	Meal and water mixed.
	1 Pure Berkshire ...	Sept. 13..	1 sow			
III.	3 Berkshire grades....	Oct. 4..	2 barrows. 1 sow	Peas, 1 part ..... Barley, 1 part	Whole grain...	Whole grain and water given separately.
	1 Pure Berkshire	Sept. 13..	1 sow			

Feeding took place three times daily, and at the following hours: 8 a.m., 1 p.m. and 5 p.m. Each group was fed all it would eat without waste. In mild weather the pigs were allowed in the yards for exercise every three or four days.

Table No. xlii shows the amount of food eaten by each group during the 134 days of the experiment.

Periods.	Days.	Food eaten by each group.		
		Group I.	Group II.	Group III.
January 17th to February 14th	28	227	197½	178
February 14th to February 21st	7	83	66	61
February 21st to March 31st	28	287	222	236½
March 31st to April 18th	28	352	268½	261
April 18th to May 16th	28	456	221	331
May 16th to May 31st	15	244	126	200
Total	134	1,649	1,101	1,267½

The animals in group I. kept good health throughout, while those in group II. were not so thrifty. B animal of this group became so stiffened by April 25th that it had to receive a change of diet, of a much lighter character. Animals C and B of the third group became slightly stiffened in limbs during the last two weeks of the experiment.

TABLE No. XLIII shows the weight of each animal at different periods throughout the experiment.

Dates of weighings.	Number of days.	Group I.				Group II.				Group III.			
		A.	B.	C.	D.	A.	B.	C.	D.	A.	B.	C.	D.
1890.		lb.	lb.	lb.	lb.	lb.	lb.	lb.	lb.	lbs.	lb.	lb.	lb.
January 17th....	.....	69½	47	67½	47	69½	51½	51½	36	73	62½	51	38
January 24th....	7 days.	72	50	76	50	85	57	56½	40	74	67	52	41
February 14th ..	21 "	87	64	98	66	110	72	69	46	94	85	59	50
February 21st ..	7 "	94	67½	105½	74	118	77	73½	46½	97½	91½	60½	54
March 21st.....	28 "	112	83	129	98	138	96	81	55	128	125	82	82
April 18th	28 "	128	101	163	132	167	122	94	77	137	137	85	84
May 16th	28 "	138	118	193	167	183	119	101	88	147	164	92	98
May 31st.....	15 "	145	128	210	183½	196	133	106	99	155	161	96	108

NOTE—A, represents thoroughbred sow ; B, grade sow ; C, grade barrow ; D, grade barrow.

TABLE No. XLIV shows the daily averages of the food eaten, and increase live weight of the average animal of each group.

Group.	Amount of meal eaten daily by average animal.	Increased live weight of the average animal.
I.....	3.07	1.35
II.....	2.27	.49
III.....	2.36	.21

On May 31st the pigs in Group I. were sold for 5¼ cents per pound. On July 23rd the thoroughbred sow of Group II. was sold for $25.00, and on September 11th the remaining pigs were sold at rate of 5 cents per pound.

(28) GREEN FODDER AS A FOOD FOR SWINE.

On June 7th, 1890, an experiment was commenced with swine to ascertain the value of green fodder as a help in cheapening the cost of producing pork.

Nine animals were used in the experiment, which were divided into three groups, with three animals in each group. The three lots were very evenly divided as regards age, breeding and class of animals, as may be clearly seen from the following table:

TABLE No. XLV shows the classification and character of the animals used in the experiment.

Group.	Date when experiment commenced.	Date of experiment closing.	Animals per group.	Litters represented in group.	Breeding.	Date of farrowing.	Class of animal.
I	June 7	Oct. 8	3	1	Berkshire, pure..	Sept. 11	Sow.
				2	Berkshire, grade.	Dec. 1	Barrow.
				3	Berkshire, grade.	Nov. 25	Barrow.
II	June 7	Oct. 8	3	1	Berkshire, pure..	Sept. 11	Barrow.
				2	Berkshire, grade.	Dec. 1	Barrow.
				3	Berkshire, grade.	Nov. 25	Sow.
III	June 7	Oct. 8	3	1	Berkshire, pure..	Sept. 11	Barrow.
				2	Berkshire, grade.	Dec. 1	Sow.
				3	Berkshire, grade.	Nov. 25	Barrow

The experiment proper continued from June 7th until October 8th, 1890, being a period of 123 days. The feeding took place three times daily, as follows: 8 a.m., 1 p.m. and 5 p.m. Previous to June 7th the animals of each group received their respective rations, and from this period of preparation an idea of the amount of food which each group would eat up cleanly was ascertained. No. I. group received all the meal they would eat, without waste, while No. 2 group received about three-quarters the amount of meal and in addition a quantity of green fodder, while No. III. group ate about one-third as much meal as No. I. and twice the weight of green fodder consumed by No. II. group. When any change in the quantity of food given took place, it was always made at the end of some one period, each period being two weeks long. The meal in every case was composed of peas 2 parts; barley 1 part; oats 1 part, and wheat middlings 1 part, while the green fodder from one time to another was composed of clover, oats, millet and corn, according to season.

The following table shows the amount of food eaten by each group at periods of fourteen days each throughout the experiment, and also the average eaten per day by each group, and by the average animal of each group.

TABLE No. XLVI shows the amounts of food eaten throughout the experiment.

Date.	Number of days.	Group I.	Group II.		Group III.	
		Meal.	Meal.	Green fodder.	Meal.	Green fodder.
June 7th to June 21st	14	168	126	42	56	112
June 21st to July 5th	14	168	126	70	56	140
July 5th to July 19th	14	168	126	84	56	168
July 19th to August 2nd	14	168	126	84	56	168
August 2nd to August 16th	14	168	126	84	56	168
August 16th to August 30th	14	168	126	84	56	168
August 30th to September 13	14	168	126	84	56	168
September 13th to September 27th	14	168	126	84	56	168
September 27th to October 8th	11	176	132	66	66	132
Total, June 7th to October 8th	123	1520	1140	682	514	1392
Average per day	1	12.36	9.27	5.55	4.18	11.32
Average of each animal per day	1	4.12	3.09	1.85	1.39	3.77

At every fourteen days during the experiment, the animals were weighed separately and the weights of each recorded. The table below besides giving the weights at each period, gives the increase of live weight of each animal, the total increase of each group, and the average increase of the three animals in the separate lots.

TABLE No. XLVII shows the weights of the different animals during the testing.

Date.	Number of days between weighings.	Group I.			Group II.			Group III.		
		Thoroughbred Berkshire.	Grade Berkshire.	Grade Berkshire.	Thoroughbred Berkshire.	Grade Berkshire.	Grade Berkshire.	Thoroughbred Berkshire.	Grade Berkshire.	Grade Berkshire.
June 7th		199	115	139	164	104	174	193	103	146
June 21st	14	215	130	152	169	114	186	196	109	148
July 5th	14	228	137	162	176	121	197	195	114	151
July 19th	14	242	145	177	170	133	209	195	116	153
August 2nd	14	250	159	185	189	142	225	193	118	158
August 16th	14	269	169	198	186	151	240	195	116	153
August 30th	14	277	184	200	199	165	253	195	129	160
September 13th	14	280	190	204	194	170	260	200	131	170
September 27th	14	296	196	219	200	175	263	196	128	165
October 8th	11	304	207	234	207	183	274	200	130	171
Increase of each animal	123	105	92	95	43	79	100	7	27	25
Increase of each group	123	292			222			59		
Increase of average animal of each group	123	97.3			74			19.7		

On October 8th, the experiment proper was closed. The pigs in No. I. group were fat and looking well, those in No. II. were also about prime ; but not as fat as those of No. I. group, while those of lot III. were not nearly prime; but were what may be classed as good store pigs;

The thoroughbred Berkshire of group I. was sold on October 7th, for breeding purposes, and brought $25. The other eight were fed until November 17th, when they were sold for $4\frac{1}{10}$ cents per pound, live weight.

(29.) Soiling Cows.

After a week of preparation, two cows were entered upon an experiment to determine how much land would be required to produce sufficient food for them during the summer season. The experiment was started on June 10th, and closed September 26th. making in all 108 days. No special preparation was made to grow the largest yields of produce upon the land, but fodder was cut from the ordinary farm fields near the barns, and the area of the patches used was carefully measured and recorded. The fodder consisted of, permanent pasture, clover (first growth), lucerne, peas and oats and clover (second growth), and was fed in the order named. The cows were kept in the main stable where they had comfortable quarters, both standing in a double stall. The cows had been some time in milk, and one calved soon after the experiment closed, and in consequence of this the only results that will be here considered is the area of land required to keep the two cows for 108 days upon green fodder.

Table No. xlviii shows the areas of ground from which the fodder was taken.

Growths.	Crops.	Area of each crop.	Area of first and second growth.	Total area.
		acre.	acre.	
First growth	Permanent pasture	.3275	.7952	1.559
	Red clover	.2322		
	Lucerne	.0500		
	Peas and oats	.1855		
Second growth	Lucerne	.0500	.7638	
	Red clover	.7138		

This shows an area of 1.559 acres required to produce sufficient food for two animals from June 10th to September 26th, or for one animal it would require .78 acre.

(30) Feeding of Steers of Different Breeds.

During the past year an experiment has been commenced to test the comparative merits for beef production, early maturity, etc. of the grades of the principal breeds of cattle in Ontario. It is expected to continue this experiment for a number of years by using three sets of animals with from one to two years intervening between the commencement of the different sets. Each set will be continued for two and a-half or three years, and careful records kept throughout the entire time.

In the early part of this year grade calves of the Galloway, Shorthorn, Aberdeen Angus Poll, Hereford, Devon, and Holstein breeds were procured from different breeders over Ontario. A representative of what is called the "Native" or "Scrub" type was obtained from Quebec, to have in the comparative test with the grades. A second grade short-horn animal was entered in the contest and was given skimmed instead of new milk for the first six months.

The animals were all received at the O. E. farm when under fifteen days old except the Galloway which was fifty-three days old when arriving for the experiment, but previous to this time he had been running with the dam.

TABLE No. XLIX shows particulars regarding eight grade calves which were entered upon experiment.

Grade.	Source of obtaining animal.	Sire.	Dam as described by the owners.	Date at which each animal arrived at Ontario Experimental Farm.	Age in days of each animal when arriving at Ont. Expt. Farm.
				1889.	
Galloway	Mr. Keough, Owen Sound, Ont.	Rajah of Brooke (3970)	A light roan, $\frac{1}{8}$ short horn and $\frac{7}{8}$ Canadian	December 26th	53
				1890.	
Short Horn	Mr. Ballantyne, Stratford, Ont.	Methlick Hero 2723 (imp.)	A high grade short horn	January 11th	14
Aberdeen A. Poll.	Messrs. Hay and Patton, New Lowell, Ontario	Runnyme 2nd, 5220	A common Canadian two-year old heifer	" 9th	8
Hereford	Mr. J. O. Clifford, Oshawa, Ont.	King Hal, owned by Mr. Drew	A good common cow	" 9th	4
Devon	Mr. Robertson, Eden Mills, Ont.	Bull, owned by Mr. Rudd	A short horn grade	" 14th	6
Holtstein	Mr. A. C. Hallman, New Dundee, Ontario	African Prince (H. F. H. B.) 1270	A common cow	February 22nd	5
Short Horn (fed on skim milk)	Ontario Experimental Farm, Guelph, Ontario	Macduff	A short horn grade	April 1st	0
Scrub	Quebec	A native bull of the rangey type	A three-year old native	April 23rd	7

The following shows the character of food used in the experiment up to the end of the first nine months:

Milk { Whole, with a very little skimmed which was reckoned as equal to one-half the quantity of whole milk.

Hay { Timothy, about one-half.
Clover, about one-half.

Meal { Peas, one-fourth by weight.
Oats, " "
Bran, " "
Small wheat, " "

Green Fodder { Clover,
Peas and oats.

The milk was fed from the pail until each animal was six months old after which time the milk was withheld. The hay was of medium quality, and was cut finely before being fed. Each animal received all the hay he would eat without waste. The meal consisted of the above mentioned grains ground together, and was fed dry until green fodder was given, at which time it was mixed with the fodder. The green fodder was cut up and fed in quantities that would be eaten up cleanly, and was fed after being mixed with the meal.

TABLE No. L shows some notes taken on the grade steers at the end of the first six months after birth of each.

Breeding.	Color of animal.	Build of animal.	Flesh.	Handling qualities.	General appetite.
Galloway grade.....	Black with very little white.	Short in the leg and blocky.	Inclined to deep and even flesh.	Good	Good.
Shorthorn "	Solid red.....	Slightly leggy for S. H. type.	Fleshed well....	"	Medium.
Aberdeen A. Poll grade	Solid black.....	Not robustly developed.	"	Medium to good.	Poor to medium.
Hereford grade.....	Typical Hereford color.	Short in legs and heavy in body.	"	Good	Good.
Devon "	Red with white spot on shoulder.	Neat, squarely built frame.	"	"	"
Holstein "	Typical Holstein in color.	Large, with a tendency to coarseness of bone.	Below average in fleshiness.	"	"
Shorthorn " (fed on skim milk).	Red and white.. ...	Large but well built.	Medium flesh..	"	"
Native or scrub.....	Light red.....	Narrow in body, flat ribbed and long in legs.	Poorly fleshed..	"	Poor.

TABLE No. LI shows the amount of food eaten for the first six months of the test by the animals under experiment.

Animals.	Date of birth	Food eaten by each animal in first three months. lb.			Food eaten by each animal in second three months. lb.				Food eaten by each animal for whole milk period (six months). lb.			
		Milk.*	Hay.	Meal.	Milk.	Hay.	Meal.	Green fodder.	Milk.	Hay.	Meal.	Green fodder.
Galloway grade	Nov. 3, 1889	770.9	8	36½	755.0	207½	245	20	1525.9	215.5	281.5	20
Shorthorn "	Dec. 28, "	1888.8	3	5	2494.8	104	191½	68	4383.6	107.0	196.5	68
Aberdeen A. Poll grade	Jan. 1, 1890	1637.0	8	17	2545.2	105	178½	57	4182.2	113.0	195.5	57
Hereford grade	" 5, "	1745.5	12½	24½	2408.4	127½	219	66	4154.0	140.0	243.5	66
Devon "	" 8, "	1387.5	8	6½	2224.0	104	128	70½	3611.4	112.0	134.5	70.5
Holstein "	Feb. 17, "	2057.8	9	12	2418.0	101	178½	125½	4475.5	110.0	190.5	125.5
Shorthorn grade (fed on skim milk)	Apr. 1, "	2018.5	4½	3½	2673.0	171	184½	212	4691.5	175.5	188.0	212.0
Native	" 16, "	1387.7	1½	1½	2374.0	70	92	148	3761.7	71.5	92.5	148.0

* Quantity of milk taken before each animal reached the farm was estimated by allowing the same daily amount during that period as during the other portion of the first three months.

TABLE No. LII shows the weights of each animal taken when six months old.

Animals.	Weight of each animal when six months old. lb.
Galloway grade	457
Shorthorn "	530
Aberdeen A. Poll grade	485
Hereford grade	545
Devon "	434
Holstein "	537
Shorthorn grade (fed on skim milk)	454
Scrub	386

(31) STABLE CONFINEMENT IN REARING CATTLE.

To get some actual results from the practice of rearing cattle without exercise an experiment was conducted during the last summer with an Ayrshire grade heifer, in which test the animal was confined in a box-stall from the time it was four days old until it reached the age of 194 days, at which time it became stiffened in the limbs so badly it had to be removed.

The animal used was from a pure bred Ayrshire bull and a grade Shorthorn cow, and was calved on May 20th, 1890. The box-stall in which the animal was kept was in the central part of the large stock stable under the main barn, and was 11 ft. 6 in. long by 8 ft. 4 in. wide. The wall was tightly boarded, 5 ft. high on all sides, above which there was an entire opening to the main stable.

For the first two weeks of the experiment the calf got all whole milk, for the second two weeks a mixture of whole and skimmed milk in equal quantity, after which time the milk given was all skimmed. When the animal was five months old the milk was stopped, and the meal, hay and roots was continued.

TABLE No. LIII shows the amount of food eaten during the confinement in the box-stall.

Food.	Quantity eaten (pounds).
Milk	2411
Meal (mixture)	473
Hay (timothy and clover)	195½
Roots (mangels)	538
Green Fodder (corn and millet)	103½

The following is the weight of the animal at different periods :—

May 20th	28 pounds.	August 20th	236 pounds.
June 20th	130 "	October 20th	390 "
July 20th	184 "	November 20th	455 "

During the experiment up to the latter part of November the heifer had a good appetite and was in good health, but at that time she began to get weak in the limbs, and by November 30th she was stiff on all limbs and unable to stand without great difficulty. On December 1st she was taken out of the stall and left in the yard a little while, and by means of some exercise each day a marked improvement was soon seen, and by December 5th she was able to run while in the yard. In two week's time of stall tying and daily exercise she gave appearance of again possessing good health and having full use of her legs.

(32) Berkshire versus Improved Yorkshire.

It is unsafe to draw conclusions from experiments in breed competition until a sufficient number has been conducted to overcome, to a large extent, the individual peculiarities of animals. It is with the hope that an opportunity may be afforded for several tests between the pure bred Berkshire and the pure bred Improved Yorkshire breeds of pigs that one has been conducted along that line during the past autumn. One animal of each breed was selected, as a larger number could not at that time be procured.

The Berkshire was a pure bred male animal and was farrowed on June 18 in a litter of nine. He was third or fourth best animal in the litter.

The Improved Yorkshire was also a pure bred male animal and was farrowed on July 4 in a litter of nine also, and was taken from the sow just at the time the experiment was commenced.

The experiment began on August 19th and continued until December 19th. Each animal had good health throughout with the exception that the Improved Yorkshire was slightly troubled with rheumatism for a while towards the end of the test but had recovered before the close.

Table No. liv shows the amount of food given to each animal during the experiment.

Months.	Berkshire		Improved Yorkshire.	
	Milk.	Meal.	Milk.	Meal.
1 (Aug. 19—Sept. 19	99 lb.	19½ lb.	99 lb.	19½ lb.
2 (Sept. 19—Oct. 19)	120 "	67 "	120 "	62 "
3 (Oct. 19—Nov. 19)	4 "	135 "	4 "	120 "
4 (Nov. 19—Dec. 19)	Roots. 29 lb.	110 "	Roots. 29 lb.	100 "

From this we see the amount of food consumed by each animal was as follows :

	Milk. lb.	Meal. lb.	Roots. lb.
Berkshire	223	331½	29
Improved Yorkshire	223	301½	29

Table No. lv shows the weights of the animals at different periods.

Dates of weighing.	Berkshire.	Improved Yorkshire.
August 19th	25 lb.	25½ lb.
September 19th	61 "	60 "
October 19th	104½ "	102 "
November 19th	140 "	134½ "
December 19th	167½ "	155 "

The Berkshire throughout the test ate thirty lb. more meal than the Improved Yorkshire and made an increase of twelve and one-half lb. over the latter. The animals are now being used for breeding purposes.

CONCLUSION.

In conclusion I wish to speak of the grain exhibit which, by your direction, I placed at the Midland Fair, Kingston; Industrial Exhibition, Toronto; Western Fair, London; and Walkerton Fair, held at Walkerton during the autumn of 1890.

This exhibit contained 328 varieties of cereal grains, of which 56 were fall wheats, 64 were barleys, 85 spring wheats, 95 oats and 28 peas. Nearly all of these were shown in the ear, and they represent the growth of the first and second years since importation, viz., the years 1889 and 1890, but they included 30 new varieties of imported winter wheats and some other kinds of grains obtained from New Zealand, tried for the first time on the farm.

Grain was shown in sample jars representing the seed as imported from various countries in Europe, Asia, Africa, New Zealand and Australia. Of these grains there were 237 varieties. There were also 66 samples of corn, all of which have been tested upon the farm by the Dairy Department, and a large number of varieties of other kinds of grain grown during 1890, in so far as they could be got ready in time for exhibition.

The facilities for experimental work have been considerably increased during the past year in the purchasing of a small separator and tread power for the experimental threshing, and also the large scales for weighing the produce from each plot. There are two features which I wish to speak about as being of the utmost importance to the real practical bearing and greater development of the experimental work at this institution for the best interests of the farmers of Ontario.

(1) That an experiment station building be erected upon the college grounds where work could be accomplished during the winter months in preparing grains and fertilisers for the coming season's experimental work and for distributing over the province; where samples of all the different varieties could be collected for close examination by ourselves and for inspection by others; and where the reports could all be prepared with the different products close to hand for reference, etc.

(2) That there be a number of branch experiment stations established throughout Ontario. In a province with such a variation in both soil and climate as is possessed by Ontario, it is quite evident that tests carried on at the station at Guelph with fertilisers, imported grains, varieties of fruit, etc., etc., cannot form close guides for the farmers in very many localities. These branch stations, with the station at Guelph as their centre, need not be very elaborate or expensive, and would form centers for experimental work n the different localities.

I would ask that you do your utmost in presenting to the Government of Ontario the advantages of these two may I say real necessities, as I am of the firm opinion that the results accruing therefrom would be of inestimable value to the farmers of Ontario.

Respectfully submitted,

C. A. ZAVITZ.
Assistant Director.

PART VIII.

REPORT OF

ASSISTANT IN DAIRY DEPARTMENT.

Ontario Agricultural College,
Guelph, Ont., December 31st, 1890.

To the President of the Ontario Agricultural College:

Sir,—I have the honor to present herewith my report upon the work done during the year 1890, in the Dairy Department. It will be most convenient to consider it under the following divisions:

1. Creamery management.
2. Feeding experiments with hogs.
3. Fodder corn and the silo.
4. Winter dairying.

1.—CREAMERY MANAGEMENT.

For parts of seven seasons the Ontario Creamery has now been in operation. Its success has been varied. The season determines to a large extent the measure of success; that of 1889 was a very dry one, the supply of cream fell away so much it was deemed advisable to close the factory the middle of August, while that of 1890 was a more favorable one in many respects. The continued wet weather in the spring and early summer, while damaging to the corn field, was beneficial to the pastures by starting a luxuriant growth which, aided by the summer showers, kept fresh much longer than usual. During September, however, the pastures were not so good and the cream fell away so much that two routes had to be gathered only twice a week instead of four times to keep down expenses.

Before commencing operations for the season the appearance of the inside of the creamery was much improved by a coat of paint. The churns, vats and other furniture were put in good shape and painted. The engine was taken to pieces, overhauled and put in good working order. The next thing to receive attention was the cold storage room. This is a necessary adjunct to a creamery and especially so where the butter remains in store until the fall. It is then imperative to have a cool, dry room of uniform temperature in which to keep the butter; if these conditions are not obtained a serious loss in the quality of the butter is the result. The cold storage room, when first built, was cooled by a current of cold air entering near the floor from a passage which ran along the bottom and up the side of the adjoining ice-house; an opening in the ceiling giving vent to the warm air. This was found to be insufficient to keep the temperature as was desired. Accordingly, a shelf arrangement of galvanized iron was made at one side of

the room to hold ice. In this way the room was cooled very successfully, but the drip from the melting ice kept the floor wet, and the dampness caused the tubs to mould on the outside. The floor settled making a place for the water to gather. Such was the state of affairs when work was started on it this spring. The shelf arrangement and ceiling were taken out, the floor levelled with cement and a new floor put in. It was proposed to put in a galvanized iron ceiling, resting on and dipping in between joists, with room above to put in ice. It was effected in this way:—joists 3 x 12 were set in place on rests securely spiked along the sides of the room; the rest on one side was an inch lower than the one on the other side, this gave a fall on the joists to one side. Over the joists was now placed the galvanized iron in the form of troughs between the joists. The object of having them in this form was to give more cooling surface below. They were about ten inches deep, closed at both ends, but there was an opening in the bottom of the trough at the lower end; this opening was to let the water formed from the melting ice escape, and opened into a flat trough underneath at right angles and connected with the main drain from the building. All the troughs opened at their lower end into this flat one. The iron was securely nailed down to the joists and to the sides of the building; all the joints were then soldered and everything made tight so that there would be no leakage. Slats were placed on top to prevent the blocks of ice injuring the iron. As the air in the storage room came in contact with the cool surface of iron it would be chilled, then sink and warmer air take its place. In this way the temperature would be kept down. As the warm air came in contact with the cold surface the moisture in it would be deposited on the iron, to prevent this dripping on the floor small troughs were swung close under the large ones to catch it and empty it into the cross-trough at the end. Thus the room was kept dry and cool; no difficulty was met with in keeping the temperature at about 50° Fahr. the whole season. The saving in ice over the old way of cooling was considerable, to say nothing about the convenience of the new plan, as a door was cut into the ice-house from the chamber above the storage room, and about fifteen blocks of ice put in once a week would give us the temperature required without any further trouble.

Early in the spring a few weeks were spent in visiting the former patrons and others in the interests of the creamery. A public meeting was then called in the city at which the report of last year was read and an outline of the proposed work, etc., for the present year presented, and a committee of management were appointed to look after the creamery in the interest of the patrons.

The cream only was gathered, the skim milk being left for use on the farms. The patrons used what is known as the shot-gun pail, a narrow pail about twenty inches deep, the patrons doing their own skimming. The gatherers carried a pail 12 inches in diameter in which all the cream was measured by a steel rule. An inch deep in this pail makes what is called a creamery inch. Credit was given each patron for the inches and eighths inches of cream he had. The cream was gathered three times a week from each patron, each gatherer having two roads, going on the same road alternate days. A sample of each patron's cream was taken every time the gatherer obtained cream from him, this was put in a numbered tube, the number marked in the gatherer's book opposite the patron's name, and the tube taken to the factory. At the factory the tubes brought in that day were warmed if necessary and allowed to stand to sour until the following morning, when they were churned in an oil test churn. In this way the churnable fat or butter-making value of each sample was determined. The variation in the quality of the different samples of cream was from nine ounces to twenty ounces of butter per inch of cream. We have thus been able to distribute the proceeds of butter sales among the patrons according to quantity and quality of the cream furnished.

The creamery has been used to a certain extent for instruction of students in the practice of butter-making. We had a young man with us the most of the summer learning to make butter besides a number of students who spent from a day or two to two weeks in the factory.

The college creamery does not afford its patrons any special advantages over what may be realised from any joint stock or private concern in any part of the province.

Those who furnish cream are paid for it at the price realised from sales of the butter manufactured, after all expenses for cream gathering, management, labor, furnishings, tubs, fuel, ice, salt, etc., etc., have been deducted. Strict economy is practised and all outlays and expenses kept as low as possible. Notwithstanding this, the cost of making per pound of butter is high. The cost of gathering the cream depends so much on the distance to be travelled for the quantity collected that the number of patrons and cows within a given area largely determines the rate per pound. For the ground covered, the number of patrons and the quantity of cream supplied is unnecessarily small. This may be accounted for to some extent by reason of the area required for supplying milk to the city of Guelph and the important thoroughbred stock interests of the country around Guelph have prevented a large number of the best farmers in the vicinity from sparing any cream for butter-making. Hence our patronage is almost wholly from farmers living from two to nine miles from the college. Another difficulty we have to contend with arises in this way. The butter market of Guelph is a good one and the withdrawal of so much butter from the market as effected by the creamery improves it for those who do not patronise the creamery; consequently, our patrons are tempted after July by the increased price to make up and market their own butter direct. The committee deemed it advisable to make an effort to prevent patrons quitting the creamery before it was closed down for the season.

The following circular was sent to every patron (only one refused to sign it) and to their credit be it said we did not have to enforce it. One or two did quit before the season was over, yet it was because they did not have any cream to spare beyond what they required for their own use.

Notice to Patrons.

The committee appointed by the patrons, and made responsible for the management of the Ontario Creamery for the present season, has decided to pay on account 16 cents per pound of butter from the beginning; but, as this price is more than the market warrants in the early part of the season, this payment of 16 cents per pound, is made to each patron with the understanding that he will continue to send his cream to the creamery till the end of the season, and that in case he fails to do so, for any reason which is not satisfactory to the committee, he shall forfeit 10 days cream and his share in any surplus which may be at the end of the season.

Further, the patrons are requested to see that the gatherers in every case stir the cream thoroughly, and take the exact full of the small dipper as a sample for testing; and if any patron observes anything that he disapproves of, or in case he is dissatisfied for any reason whatever, he will oblige by at once making the matter known to some member of the undersigned committee.

We may simply add that every effort will be made to manage the creamery in such a way as will be satisfactory to the patrons.

(Signed), Duncan Macfarlane, Aberfoyle,
Duncan Gilchrist, Arkell,
Jas. Lennie, Guelph,
Alex. McIntosh, Mosboro',
John Crosby, Marden.

Ontario Agricultural College,
Guelph, May 15th, 1890.

N. B.—Patrons are particularly requested—

1. To see that the udders of their cows are brushed, or rubbed with a damp cloth before milking.

2. To see that the cows are not milked in stables or other places where there are any strong or offensive smells.

3. To see that the milk is not at any time allowed to stand where there are bad smells, but is carefully strained into thoroughly scoured and well aired cans as quickly as possible after it is drawn from the cows.

4. To see that the cans receiving the milk are promptly placed in the coldest water that can be got, and that the water be changed twice in case no ice is used. Otherwise, some of the cream will be left in the milk.

The agreement between the committee and the patrons at the beginning of the season was to the effect that they should receive after the end of each month a cash advance on the cream supplied, at the rate of 16 cents, per pound of butter made. After providing for these prices, and paying all expenses out of receipts from the sale of butter and buttermilk, there is a balance of $207.35 on hand for distribution among them.

A summary of the season's business is herewith presented—

Receipts.	$ c.	Disbursements.	$ c.
Sales of butter	5,908 75	Patrons for cream	4,479 26
Sales of buttermilk	216 44	Labor	294 57
		Cream gathering	654 00
		Salt, tubs, fuel, ice, repairs, sundries, etc.	490 01
		Balance on hand	207 35
	6,125 19		6,125 19

Butter manufactured	29,252	pounds
Average price per pound of butter	20.20	cents
Number of patrons	85	
Number of days in operation	110	
Routes travelled by cream waggons	4	

Length of routes ranged from 18 to 25 miles.

Cost of cream gathering	2.24		cents per pound of butter.	
Cost of labor	1.01		"	"
Cost of furnishings	1.67		"	"
Total	——	4.92	"	"
Cr. Receipts from sales of buttermilk		.74	"	"
Net cost for collecting cream and manufacturing		—— 4.18	"	"

The cost per pound is still much higher than it should be, although every reasonable effort was made to reduce the rate. It is very high when compared with that of many of our leading creameries. Salt of Canadian manufacture was used at the rate of about an ounce to the pound of butter, and the butter packed in tin lined tubs.

2.—FEEDING EXPERIMENTS WITH HOGS.

The progres of ideas as connected with farm practices is far more rapid than farmers get credit for as the work goes along We have only to look back over a few years of time to learn that great changes in methods and practices have taken place, and have settled down into the position of common practice. This change has been very marked in some lines of farm practices ; but none more so than in the business of growing and

fattening pork. It is more plainly illustrated in the west with their larger operations, though the change has taken place here as well as there. It was but a few years ago that it was the general understanding, that a hog must be a year old or more before he was ready to be fitted for the butcher or consumer, that heavy weights with a lot of fat must be obtained. The demand for that kind of meat has passed; a lighter hog with more lean meat, long sides and good quarters is wanted.

It has been shown that a pound of growth could be made on less food, and at far less cost on a growing beefing animal than on an old one, that, in fact, it was a law of growth that the younger the animal, the greater the growth per day, and the less food called for per day. This is just as true of a hog as of a cattle beast, and growers were not slow to take advantage of it, for, in feeding as in all other lines of farming, the factor of profit holds the leading position and all progress is rightfully following its lead.

The growing of pork is rapidly on the increase in Ontario; this is as it should be for there is money in making pork of the proper quality. We have no animal that makes so good a use of the food fed it as the despised grunter. They digest a larger percentage of their food than any other animal; they also require less food to support life, respond most readily to good treatment and in every way are the most profitable, when rightly managed, of our farm stock. Although great changes have taken place in the growing and fattening of our hogs—there is another change that should be made, that is, in the time of marketing. Hitherto, the general time of marketing has been late in the fall or early winter. A study of the prices for pork during the last few years reveals the fact that the highest prices are paid for pork during the summer months, the highest price generally being given in August, for pork of the right quality. Our farmers should endeavor to supply the demand during these months when our packers buy largely of American pork. Canadian fed hogs bring higher prices than the American ones, because they make better pork. The demand for them is always so brisk during the summer months that sales are easily effected at good prices. As we fatten hogs for profit, or if we don't we should, this is a matter we should take into consideration, it is the little gains like this that make up the sum of our yearly profits, they are, therefore, worthy our most earnest attention. As young pigs cannot be made to attain the most profitable weights under six months, it would not be easy for many of our farmers to furnish pigs for the early part of the season; but those farmers who have warm pens could do it from late autumn litters, and many of them could obtain much higher prices for their pork than they do at present, if they would have litters in February and March. They could then get their pork on the market before the market becomes glutted in the fall.

Experiments in Feeding.

Every animal requires a certain amount of food to sustain life, this may be called the food of support, or a maintenance ration. It goes to produce heat, repair waste tissue, and to do the necessary functional work of the body, it is to keep the animal from losing flesh, at the same time it is not so great as to cause any increase in weight. Any gain in weight an animal makes comes from food over and above that required to sustain life, hence we see why liberal feeding always pays. This maintenance ration increases as an animal increases in weight; we have thus to feed heavier as the animal grows older, to get a corresponding gain. During the past season experiments in feeding hogs were carried on to ascertain, if possible, the increased rate or amount of food required as the animals grew and were carried to heavy weights.

The following conditions, etc., apply to all the pig experiments recorded. The building was of stone, cool in summer and warm in winter, fairly well ventilated, windows darkened in the hot weather to keep out flies, for pigs like comfort and peace. A small yard at the rear of each pen gave an opportunity for fresh air and exercise. Feeding was done three times a day, regularly. The feed in all cases mixed in the trough, with water or milk as the case might be, immediately before the pigs had access to it; they had a liberal supply of salt; all feed was weighed; once a week the pigs were weighed and a record kept of each.

I. *Pens Nos. 1 and 2.*—In August last year eight pigs of the same litter, a Yorkshire cross, were divided as evenly as possible into two pens of four each. The object being to feed them on middlings, salt and water, to find the increase of food required to put on a pound of flesh as they gained in weight. The pigs weighed about 40 lb. each on an average when they entered on the experiment. Both pens continued until the pigs weighed an average of about 140 lb. each. Pen No. 1, was then put on the rape ensilage for six weeks, when this was done they were continued on middlings until the close of the experiment, a suitable allowance of time was made for change of feed. Pen No. 2 was fed middlings continuously and both pens were carried on until they had attained an average weight of nearly 300 lb.

The following table shows the weight of each pen at the beginning and end of the different periods into which it has been divided. It also shows the gain made, feed consumed, the amount required to make a pound of flesh, and percentages of increase.

TABLE I.

Pen Nos. 1 and 2.

Increasing in weight from	No. of pen.	Weight at beginning of feeding period.	Weight at end of feeding period.	Gain.	Middlings consumed.	Middlings consumed per pound of increase.	Average of pens 1 and 2.	Increased percentage of food required per pound of gain.
40 to 95 lb ..	1	158 lb ..	385 lb ..	227 lb ..	436 lb	1.92 lb ..	2.095 lbs	
	2	170 " ..	360 " ..	190 " ..	433 "	2.27 " ..		
95 to 140 lb ..	1	385 " ..	545 " ..	160 " ..	521 "	3.25 " ..	3.255 "	55.37
	2	360 " ..	520 " ..	160 " ..	522 "	3.26 " ..		
140 to 175 lb ..	1	555 " ..	685 " ..	130 " ..	Middlings, 211 lbs .... Rape, 2,018 lbs ..	Middlings, 1.62 lbs .. Rape, 15.53 " ..	4.73 "	45.31
	2	520 " ..	701 " ..	181 " ..	1,856 " ..	4.73 " ..		
175 to 250 lb ..	1	708 " ..	972 " ..	264 " ..	1,153 " ..	4.36 " ..	4.16 "	
	2	701 " ..	990 " ..	289 " ..	1,146 " ..	3.96 " ..		
250 to 300 lb ..	1	972 " ..	1,163 " ..	191 " ..	775 " ..	4.05 " ..	3.90 "	
	2	990 " ..	1,190 " ..	200 " ..	750 " ..	3.75 " ..		

The rape saved very well in the silo coming out nice and fresh, the pigs took to it readily and did very well on it. According to this experiment 5 lb. of rape ensilage was equal to 1 lb. of middlings in producing a pound of gain in live weight. In another experiment carried on at the same time, and given in last year's report, page 187, it took 5.12 lb. of the rape ensilage to equal one pound of the middlings. The value of rape as a food for hogs should not be overlooked in these days of rape growing.

In looking over these results we see a steady increase in the amount of food required to put on a pound of flesh as the pigs grow older and heavier; after they had attained a weight of two hundred pounds it decreased somewhat. We find a similar increase and decrease in the other experiments, in the food required for a pound of flesh. We also notice that the most feed was required to put on a pound of flesh when the pigs were making a gain from 150 lb. to 200 lb. The feed required to increase the weight of the

pigs one pound, from 95 to 140 lb. was on an average 55.37 per cent. greater than that from 40 to 95 ; and from 140 to 175 lb. 45.31 per cent greater than from 95 to 140 lb., also, that it required 90.45 per cent. more feed to put on one pound of the second hundred than the first hundred pounds. The food required for increasing the live weight above 200 lbs. is not so great, yet much greater than for weights nearer the 100 lbs. Heavy weights and a great amount of fat are not wanted.

In the month of April 19 hogs were purchased and divided into three lots as equally as possible, so as to have three pens well balanced for experimental work. A different kind of food was fed each pen and notes on their respective gains made.

II. *Pen No. 3.—Feed, Middlings.*—A few weeks preparatory feeding was given them. They got about as much skim milk and buttermilk to drink as if water had been given them, this was discontinued at the end of the first feeding period. and from that until the close of the experiment they got water only to drink. For the sake of seeing more plainly the rate of increase in the feed the feeding period has been divided into four parts. The weights come as near the even numbers as it is possible to get them.

TABLE II.

Pen 3—Six Hogs..

Increasing in weight from	Weights at beginning of feeding period.	Weights at end of feeding period.	Gain.	Middlings consumed.	Middlings consumed per pound of increase.	Increased percentage of food required per pound gain.
50 lb. to 78 lb .	328 lb	468 lb	140 lb.	315 lb	2.25 lb	
78 " to 105 " ..	468 "	629 "	161 "	573 "	3.36 "	49.33
105 " to 153 " ..	629 "	930 "	291 "	1,643 "	5.64 "	67.85
153 " to 197 " ..	920 "	1,180 "	260 "	1,161 "	4.46 "	

The amount of food required to make the gain of one pound from 78 lb. to 105 lb. was 49.33 per cent. greater than that required in making the same gain from 50 lb. to 78 lb. while the increase in the amount of food required to make the gain of one pound from 105 lbs. to 153 lb. over that from 78 lb. to 105 lb. was 67.85 per cent., or 150.66 per cent. more than from 50 lb. to 78 lb. To make the gain of one pound from 105 lbs. to 153 lbs. required 101.4 per cent. more feed than that required to make the same gain below 105 lbs.

In increasing from 50 lb. to 105 lb. it required on an average 2.805 lbs. of middlings to put on a pound gain of live weight, while the average from 50 lbs. to 197 lb. was 4.33 lbs. to put on a pound gain.

III. *Pen No. 4, Five Pigs.—Feed, Bran.*—After a short preparatory feeding on middlings and milk, they were put on bran, as much as they would eat, with what skim milk and buttermilk they would drink, the milk was continued through the experiment, towards the close however it diminished somewhat.

The object of this experiment was to show the value of bran as a feed for hogs, where there was a liberal supply of skim milk. Hitherto bran has not been considered a very suitable food for pigs.

TABLE III.

Pen 4—Five Hogs.

Increasing in weight from	Weight at beginning of feeding period.	Weight at end of feeding period.	Gain.	Weight of bran consumed.	Amount of bran per pound of gain.	Increased percentage of food required per period of gain.
50 lb. to 74 lb ..	250 lb	371 lb	121 lb.	322 lb	2.66 lb	
74 " to 103 " ..	371 "	517 "	146 "	424 "	2.90 "	9.02
103 " to 147 " ..	517 "	734 "	217 "	809 "	3.72 "	28.27
147 " to 162 " ..	734 "	808 "	64 "	392 "	6.12 "	64.51
50 " to 147 " ..	Average.....	.....	.....	.....	3.21 "	

The pigs were not continued long on the fourth period, as it was plainly seen they had got about as far as it was profitable to feed the bran. They were a thrifty looking lot of pigs and grew heavier frames than their mates of the same litter that were fed on middlings and pea meal; they were not fat but had a good covering of flesh, two weeks fattening on corn meal made them ready for market. The gain on the corn meal was very rapid it required 3.22 lb. of meal to put on a pound of flesh.

This one experiment goes to show, that bran is a good food for pigs, in conjunction with a supply of milk, that they can be carried to a weight of over one hundred pounds very cheaply. They would require to be finished off on some other food. The hog grown this way will be more nearly what the packers want than the one grown on richer food, and kept fat from the start.

IV. *Pen No. 5, Eight Pigs.—Feed, Pea Meal.*—These pigs did not have much preparatory feeding, but were put on the pea meal a week or so after they were weaned; they had all the pea meal they could eat, and all the milk they cared for until the end of the second feeding period, when they weighed about 78 pounds apiece, after that they got no more, only water to drink. Though they had all they could eat, there was not one of them went off their feed or feet.

TABLE IV.

Pen 5—Eight Hogs.

Increasing in weight from	Weight at beginning of feeding period.	Weight at end of feeding period.	Gain.	Pea meal consumed.	Pea meal consumed per pound gain.	Increased percentage of food required per pound gain.
34 lb. to 50 lb ..	272 lb	406 lb	134 lb .	202 lb	1.50 lb	
50 " to 78 " ..	406 "	625 "	219 "	396 "	1.80 "	20.00
78 " to 115 " ..	625 "	925 "	300 "	969 "	3.23 "	79.44
115 " to 149 " ..	925 "	1,195 "	270 "	907 "	3.36 "	4.00
149 " to 194 " ..	1,195 "	1,556 "	361 "	1,613 "	4.46 "	32.73
194 " to 230 " ..	1,556 "	1,840 "	284 "	971 "	3.42 "	
34 " to 230 " ..	Average..	.....	...	.....	3.23 "	
34 " to 115 " ..	"	....	.....	....	2.18 "	
115 " to 230 " ..	"	.....	.....	.....	3.74 "	71.55

The rapid increase in the amount of feed required to put on one pound of gain in the third feeding period may be accounted for to some extent by the supply of milk being discontinued at the end of the second feeding period. It required 71.55 per cent more feed to put on one pound gain between 115 lb. and 230 lb. than it did from 34 lb. up to 115 lb.

In all these experiments we notice a steady increase, as the animals get older and heavier, of the amount of food required to lay on one pound of flesh. This appears to be greatest, in most cases about the time they attain a weight of two hundred pounds, after that it diminishes somewhat. Young pigs are the cheapest to feed and should be turned off about the time they attain a weight of one hundred and fifty pounds, live weight, as the least amount of food as a rule will then be required to produce a pound of flesh.

3.—FODDER CORN AND THE SILO.

The system of providing feed by means of the silo has been in practical operation in Ontario for a number of years, and is reaching an age which should enable it to speak for itself. Nearly every farming section of the Province now has one or more silos in it or near it; this makes it possible for those who have not decided to build one, but are considering it, to become thoroughly acquainted with its workings before they undertake to build one for themselves. They are, therefore, not called upon to exercise the same amount of faith in this new departure in feeding that was required of those who built the first ones and had to follow the directions blindly.

Many of those who have tried them have not been as sucessful as they would like, but they do not lay the cause of failure to the silo, rather to some mistake of their own, either in faulty construction or improper methods of harvesting and filling that could be easily remedied the next time the silo was filled. The objections come mainly from those who have had no experience with them, and have had nothing whatever to do with one. We have yet to hear of a person who has a silo complaining that it was not a success. Experience has taught us how we may avoid many of the objections urged against the silo in its early history, as for instance, that of scouring and giving a bad odor to milk from animals fed on it. These have been largely overcome by taking the corn at a proper stage of maturity and a better manner of feeding it, for it must be remembered that no food when fed alone will give entire satisfaction; ensilage is not a complete food in itself, though it may perhaps come the nearest to it if the corn has been well matured.

Among our most advanced silo advocates the question now is not so much, Does it pay to build a silo? as it is, "How can we perfect the silo?" or "How can we get better results from the silo?" A great deal has been learned about it, but there is a great deal we do not yet understand about it. There is work here for our experimental stations to solve for us.

It is admitted by all intelligent cattle feeders that some succulent food is needed during the winter to keep the animal system in good order, where much dry concentrated food is fed. Such a food we find in ensilage, as it comes the nearest to grass of any food we have to feed during the winter, it is especially valuable in the dairy as a winter food, as its effect on the animal system is such that the butter made from it has much more of the nature of grass butter than that made from dry concentrated feed, The idea that ensilage taints the milk has been exploded. Spoiled ensilage will taint the milk in the same way that any foul food will, but good sweet ensilage will not taint the milk. If the milk has a taint supposed to be from the ensilage, and the ensilage is good, it would be well to look around for some cause for it other than the ensilage. If the milk is allowed to stand around the stable where the ensilage is fed it will soon smell of it; it should be removed from the stable as soon as drawn.

Since silage makes such a good substitute for grass, why not feed it all the year? It requires at present on the large majority of farms from five to six acres to keep one animal

the year round. In almost any part of Ontario ten to fifteen tons of corn can be obtained to the acre, ten tons of ensilage will with some grain, feed an animal the year round or in other words we can keep one animal on one acre instead of it requiring five or six to do it. This may be putting it high, but there is nothing to hinder many or all of our farmers doubling the amount of stock which they keep. We are crying about hard times; we look to our legislators to help us, and sit idly by instead of trying to help ourselves. We will not succeed that way, we must help ourselves to success. One way of doing this is by growing more corn, and feeding more animals. It is not necessary we grow all corn, there should be sufficient ensilage to feed until fall sown rye would be ready to cut in the spring, or failing that until clover would be large enough to cut; this might last with another green crop sown in the spring until the new corn crop would be ready to cut. The excess of these crops may be made into hay or put in the silo and fed in the fall if preferred. Rye, clover, oats and peas, etc., can all be saved most successfully in the silo, so that variety can be given the animals the whole time. Soiling is a practice the farmers of Ontario will have to adopt sooner or later to make the most of their land. A simple calculation will convince most men that they can winter an animal cheaper than they can pasture it during the summer. Then why not give up pasturing so much. An acre of grass cut and taken to the animals will feed more than if they had free access to it themselves, as they would lie on it and tramp it down so that a large proportion of it would be wasted, not to say anything about that lost through their droppings falling on it or of the loss of the droppings themselves. The great bugbear about soiling is the amount of work it makes. It certainly means more work but does it not also mean larger returns? Too many farmers try to do a little soiling just to see how it will do, but they find the work so heavy they give it up in despair; why is this? Because they have been trying to do the extra work with the usual amount of help after they have done their day's work; extra work needs extra hands to do it, if they would try it that way they would find that it was a much better way, and the increased returns would soon more than pay for all the extra work, and leave a handsome profit besides.

Growing the corn crop.—The field set apart for growing the corn this year was the one known as No. 12. It consists of about eighteen acres, the newest and at the same time the wettest field on the farm. Only some two or three crops have been taken off it since it was brought under cultivation, hence it was thought that an excellent crop of corn would be obtained without manuring the field. It had been underdrained before it was broken up, but in several low places the drains had not been put down deep enough, for the plow had turned out the tiles; the water did not drain away from these places readily; about four acres of this was not sown with corn, it was too wet and did not get dry enough to work until the end of July.

The field was plowed in the fall and worked up with the disc harrow and spring tooth cultivator in the spring. The open winter before and the heavy spring rains left the ground hard and sad, it required more work to get a good seed bed. In the lower parts of the field the soil was a vegetable mould the rest a clay loam, all the cradle knolls had not been worked down; this proved disastrous for the corn as it was drowned out in the hollows, while that on the knolls did not do as well as it should have done; altogether the field was not a very satisfactory one for experimental work for the season we had, had it been a dry one no doubt a good crop of corn would have been realised.

Planting.—The first of the corn was sown the 28th of May, and it was all sown by the 31st. This was as early as we could do anything with the land; the spring was wet and the land so low. A common force feed seed drill was used for planting; all the spouts but two were closed, by regulating the feed the corn could be dropped at the desired rate. It was nearly all sown in drills three feet apart. Some for experimental purposes was sown at three and a half and four feet apart, different rates of seeding to determine what rate would give best returns, as one grain every six inches, eight inches and twelve inches; the different rates of seeding were continued in drills at different widths. Of the many varieties tried last year only forty-six were deemed of sufficient

value to try again this year. These were sown in drills across the field, one row of each kind, three feet apart, and the same number of grains to the foot as evenly as possible.

As part of the field was too wet to plant, land equivalent to that part was obtained in two other places, the ground prepared and sown the 9th of June, wet weather preventing sowing earlier.

After the corn was sown and about ready to come through the ground, the heavy rains flooded the field and much of it was drowned out. Six acres was so badly destroyed that it was ploughed up and sown again June 26th. It came on quickly making a good growth; the ground was cleaner and easier worked than the early sown land, but being on the low part of the field was badly frozen by an early frost the 1st of September and had to be cut before it had attained respectable growth. The blanks in the corn were all replanted June the 25th and 26th.

Cultivation.—As soon as the corn was nicely through the ground it was harrowed. Then the horse hoe was used almost continuously all summer. This kept down the weeds in between the rows, kept the ground loose and the continued stirring would tend to preserve the moisture in the land during the hot weather.

Manure—This is a point which may be taken up here as well as anywhere else. The value of a good coating of manure to a field intended to grow corn can hardly be estimated. The field this year had no manure, as a result the growth was uneven, even if it was a new field and in fairly good heart. Last year the same thing was noticed, the part of the field that was manured gave a good even stand of corn, while the unmanured portion was very uneven. The corn plant is one of the largest air-feeding plants we have, and weight for weight with other crops, is perhaps not so exhaustive on the land as they are, but the enormous yields of corn so frequently obtained make it after all an exhaustive crop. Its mass of roots indicates it to be a gross feeder, while the slow, poor growth it makes on unmanured ground, indicates that it has not the same powers of elaborating its food from the soil that other plants have, or if it has, the season is too short to elaborate the quantity necessary to make the growth we like to see, hence to get the best results with a corn crop, the field should receive a good coating of manure, this will insure a good, even stand of corn, because the roots will have an abundance of food ready for them to work upon, the growth of roots will be much greater, and the growth above ground will be correspondingly great. For experimental purposes, the ground should be manured, the growth then will be even for comparison, whereas on unmanured ground, the growth would be so uneven, definite results could not be counted upon. Where different varieties are being tested side by side, the ground should be manured to allow them to do the best they can. The best corn this year was a piece of about two and one-half acres, manured heavily for potatoes the year before, sown late, the 9th of June, its average height was eleven feet: there was a good development of ears; two average rows were weighed and shewed a weight of over twenty-two tons to the acre. A portion in another field was weighed to estimate the weight for the British Farmer Delegates and showed a weight of over twenty-five tons to the acre.

Results.—Some of the experiments planned and started were destroyed altogether or rendered useless by so much of the crop being drowned out or plowed up. In replanting the different varieties, it was found that some of them had suffered more than others, hence strictly accurate results cannot be obtained from this year's work, as the corn replanted did not come on evenly, and in a number of experiments the amount of corn sown a second time was so large as to render it worthless as an experiment. The cradle knolls, as already mentioned, proved another source of failure.

The second sowing of corn, or rather that which was planted among the other corn, was badly frozen, while the corn around it was not touched. A striking illustration of this was seen in a single stalk of corn growing on the six acres that had been plowed up. In some way or other it had escaped destruction and had attained a fair growth, the later sown corn around it was frozen almost to the ground, while it was untouched. This was evidently due to the larger percentage of moisture in the later grown plant, while the older plant, being more mature, with less moisture, was not affected in the

same way by the frost. It was noticed in some of the last standing corn that the late sown corn amongst it was touched with the frost fully two weeks before the first sown corn showed any signs of the effects of the frost.

Table I. gives the results of experiments with different quantities of seed per acre in drills, the same width apart, and with drills different widths apart. It was tried with the Mammoth Southern Sweet, the Red Cob and the Giant Prolific Sweet Ensilage corns and the Pearce's Prolific field corn. The first three were a failure on account of the replanting, only the last one gave reliable results as it was not affected in the same way by the wet weather. Three hundred feet of two rows of each lot were weighed and the weight per acre computed from this.

TABLE I.

Kind of corn.	Lot.	Date of planting.	Width of drills.	Seed per acre.	Maturity.	Yield per acre.
Pearce's Prolific	4	May 31st..	3 feet	35 lb.	Roasting ..	21,998 lb.
" "	5	" ..	3 "	29 "	" ..	21,099 "
" "	6	" ..	3 "	20 "	" ..	22,207 "
" "	7	" ..	3½ "	18 "	" ..	26,451 "
" " ...	8	" ..	4 "	15 "	" ..	27,612 "

The average height of the corn was about six feet, at the time of cutting the grain in the ears was quite hard and nearly ready to cut for field curing. Every stalk carried an ear and many of them two good sized ears.

Lots 7 and 8 had a greater leaf development than the others, the leaves were also of a much darker green, showing a stronger growth. There were also a greater number of suckers, stronger and heavier stocks and a larger percentage carrying two ears.

In this corn we had quality, the quantity was also good. Last year the same kind of corn attained a weight of 16 tons to the acre. The growing period was about 100 days.

Table II. shows a comparison of the different varieties of corn grown side by side in single rows to discover the comparative degrees of maturity attained in 100 days growth, and also for a comparison of the yields per acre. Three hundred feet of each row was weighed and the weight per acre computed from these weights. The stages of growth were termed "Tasselling," "Silking," "Blossoming," "Out of Bloom," "Early Milk," "Late Milk" and "Ensilage." The number of ears on ten average stalks is also given.

TABLE II.

Variety of Corn.	1890. Average height attained.	1890. No. of ears to every 10 stalks.	1890. Stage of maturity or growth reached.	1890. Green, weights per acre in pounds.	1889. Stage of growth reached.	1889. Green, weights per acre in pounds.
Chester Co. Mammoth	8 feet.	.....	Out of bloom....	35,458 lb.	Early milk .	22,823 lb.
Calico Dent	7½ "	8	Early milk	32,210 "	Out of bloom	30,508 "
Mammouth S. Sweet	9 "	...	Silking	29,548 "	Silking.....	33,810 "
Wisconsin Yellow Dent	8 "	10	Late milk	29,513 "	Early milk .	37.149 "
Cranberry White Dent	8 "	6	Early milk	28,484 "	" .	36,508 "
Leaming Dent	8½ "	7	"	27,472 "	" .	28,333 "
Red Cob Ensilage	9 "	.....	Silking	26,301 "	Silking.....	30,900 "
Giant Prolific Sweet Ensilage	9 "	.....	"	25,982 "	"	25,230 "
Thoroughbred Flint	7½ "	6	Late milk	25,662 "	.....	.....
Hickory King	9 "	.....	Silking	25,448 "	Silking.....	40,530 lb.
Sheeps Tooth	8 "	.....	Early milk	25,183 "	"	41,220 "
South-Western	8 "	.....	"	25,183 "	Blossoming.	37,140 "
Woodworth's Yellow Dent	8 "	9	Late milk	24,383 "	Early milk .	29,087 "
Asylum Sweet	4½ "	6	Early milk	24,330 "	" .	30,810 "
Edmund's Premium Dent	8½ "	8	" . ..	23,798 "	" .	34,481 "
Sibley's Pride of the North	8 "	8	"	23,691 "	" .	34,530 "
Wisconsin White Flint	7½ "	9	Late milk	23,639 "	" .	37,468 "
Compton's Early	6 "	10	Ensilage	23,107 "	" .	32,490 "
North Star Yellow Dent	8 "	10	Late milk	22,946 "	" .	29,522 "
King Phillip	7 "	10	Ensilage	22,749 "	Late milk ..	31,987 "
White Flint	6½ "	9	"	22,679 "	Early milk .	30,343 "
Champion White	8 "	.....	Out of bloom ...	22,308 "	....	.....
Wisconsin White Dent	8 "	9	Early milk	21,615 "	Early milk .	33,205 lb.
Red Glazed	6 "	10	Ensilage	21,562 "	.....	.....
White Western	8 "	.....	Silking	21,562 "	.....	.....
Giant White Southern	8 "	.....	"	21,296 "	.....	.....
Horse Tooth	8 "	8	Early milk	21,082 "	Blossoming.	33,379 lb.
Golden Dewdrop	7 "	9	Ensilage	20,977 "	Early milk .	30,585 "
Longfellow	7 "	8	Late milk	20,071 "	" .	29,754 "
Angel of Midnight	6½ "	8	"	19,166 "	" .	33,150 "
Pride of the North	7½ "	8	"	18,737 "	Late milk ..	31,504 "
Stabler's 2nd Early	4 "	.....	"	18,686 "	.....	.....
100 day Corn	7 "	9	"	18,367 "	Early milk .	23,775 lb.
Egyptian Sweet	5 "	5	Early milk	18,267 "	Blossoming.	37,300 "
Early Adams or Burtington	7 "	10	Late milk	17,953 "	Late milk ..	27,347 "
Hickox Sweet	4½ "	2	Early milk	17,950 "	Out of bloom	26,280 "
Pearce's Prolific	5 "	9	Late milk	17,462 "	Late milk ..	32,828 "
Parish White Dent	8½ "	.....	Silking	16,611 "	Silking. ...	33,666 "
Smut Nose	5 "	10	Ensilage	16,291 "	.....	.....
Tuscarora	6 "	10	Early milk	15,758 "	Early milk .	23,954 lb.
Evergreen Sweet	4½ "	2	"	14,854 "	Silking.....	26,115 "
Self-Husking	6 "	10	Ensilage	14,800 "	Late milk ..	25,260 "
Canada Yellow	7 "	10	"	13,682 "	Early milk .	28,170 "
Old Colony	4 "	8	Early milk	11,606 "	" .	19,285 "

The Growth of Corn.—During the month of August nearly 600 measurements were taken of growing leaves and tassels of the corn. The object being to ascertain, if possible, the rapidity of the growth of the leaves and of the stalk when shooting the tassel.

For measuring the growth of the tassel plants were selected in which the tassel was just showing itself among the leaves, measurements were then taken of this as it grew until it had attained its growth. The leaves were taken in a similar way; they were taken just as they commenced to unfold themselves from the centre roll and to spread out. All the measurements were made from August 13th to 29th, at the same hour in the day and in the same order. The averages per day given in the following table are obtained from the daily measurements taken during this time. The maximum and minimum growths are also given.

TABLE III.

Number.	Average growth per day as obtained from the daily measurements.		Maximum growth.		Minimum growth.	
	Leaf.	Tassel.	Leaf.	Tassel.	Leaf.	Tassel.
	inches.	inches.	inches.	inches.	inches.	inches.
1	2.03	2.03	3.37	4.37	1.00	.50
2	1.93	2.00	4.50	4.00	.50	.50
3	1.76	1.83	2.37	3.00	1.00	1.00
4	2.21	2.38	3.50	3.00	.50	1.50
5	3.00	3.22	3.33	3.75	2.50	3.00
6	2.33	2.64	3.12	3.16	1.00	2.00
7	2.1	2.32	2.50	3.16	1.00	1.00
8	2.15	2.30	.25	4.00	.50	.50
9	1.76	1.60	3.00	3.00	1.00	1.00
10	2.42	2.50	3.33	3.50	1.00	1.25
11	1.86	2.00	5.00	6.00	.00	.00
12	1.33	1.53	2.00	2.50	.00	.50
13	1.61	1.88	2.66	3.50	1.00	2.00
14	2.08	2.20	2.50	3.00	1.00	.50
15	1.22	1.77	2.66	3.50	.25	.50
16	1.86	1.93	3.00	3.00	1.00	1.00
17	1.80	1.55	3.50	2.50	.00	.50
18	1.86	1.90	2.50	2.66	1.20	.50
19	1.86	1.93	3.00	3.00	.50	.50
20	1.96	1.66	2.25	3.00	1.00	1.00
21	1.30	1.57	2.00	2.50	.50	.50
22	1.83	.....	2.50	.....	.50	.....
23	1.41	2.17	3.50	3.25	.25	.50
24	2.30	.....	2.00	.....	.50	.....
25	1.76	.....	3.00	.....	1.00	.....
26	1.73	2.06	2.50	3.00	1.00	.50
27	1.80	1.83	2.37	2.37	1.00	1.00
28	2.10	2.13	3.00	3.00	.00	.50
Average	1.92	2.03	2.97	3.27	.69	.89

Conclusions.—All other things being equal, the rapidity of growth depends on the weather. This was noticed very markedly, a fine hot day always resulted in a very rapid growth, as high as three inches in the 24 hours and in one or two cases as high as five inches. If the day was cold the growth was very slow, in some cases none at all. The growth during the night was *nil.*

Filling the Silo.—This was commenced the 15th of September. The corn was cut with an ordinary reaping hook and allowed to wilt for about a day. Platform waggons, as described in Bulletin XLII. of the college, were used for drawing it to the silo. Here it was cut in two-inch lengths and elevated into the silo by a Smalley ensilage cutter and carrier. The power was furnished by the farm engine. The filling was somewhat irregular, as the farm needed the engine certain days in the week for cutting feed, etc., hence we would fill for a day or perhaps two days in one silo, then move the machine to the other silo and set up while the farm was using the engine; cutting would be done here for a similar period when we would move to the other silo again. A man was kept in the silo constantly to tramp and level, special pains were taken to have the corners well tramped. Though the silos were thus filled rapidly no trouble was experienced in getting the required temperature for sweet ensilage. The corn being in the right state for putting in the silo the heat worked up through it very quickly. If the corn is in the right state when put in the silo there is no need for any delay in filling, it can proceed until the silo is full. Care should be taken in levelling a silo that the anxiety to have the sides firm and solid so that it will keep well does not lead you to forget to keep the centre the fullest. There will be more settling there than at the sides, and if not kept full when it settles will have a tendency to draw the silage away from the outsides towards the centre, and much waste may be caused thereby.

A covering of cut straw about one foot deep was put on the top of the silo at the new barn. On the silo at the dairy barn about one-third of it was covered in the same way, another third covered with uncut straw and the remaining third left uncovered. So far as appearances go and what testing has been done, the results are in favor of that covered with the cut straw immediately after the filling of the silo has been completed.

In the rapid development of the silo we have jumped from heavy weighting to no weighting at all. We may have traveled too fast, and may have to go back over some of the ground. I think there would be less waste on the top of our silos if some pressure were added; the top is so loose that it is very difficult to prevent considerable waste. A weight would tend to press this loose top down and thus exclude the air from penetrating so far into the corn. The bottom of the silo gets pressed sufficiently, the top does not. We would not suggest heavy pressure of any kind only after the silo was full and ready to close up.

Shrinkage in the Silo.—The silo is a most successful way of saving green feed; it is thought that this saving is effected without any loss in the feeding value of the food ensiled and without any shrinkage in weight. In saving corn in the shock in the field there is a loss in the weight and in feeding value. Some authorities put this loss as high as twenty per cent. and that we have a loss also in the silo of from ten to fifteen per cent of the feeding value. An experiment was conducted in connection with the silo, this fall, to ascertain if possible the real loss there may be in weight and feeding value. A box was made of wire netting, with the meshes small enough that no corn could get out or any get into it, yet not so close that when it was buried in the silo it would not be subjected to the same conditions as the rest of the contents of the silo. This box was filled with cut corn the same as was going into the silo at the time, closed up and buried in the silo A sample of the corn was taken for analysis, that we might know the composition of the corn that went into the silo. Some time after the silo was opened the box was uncovered, it was taken out and contents weighed; when compared with the green weight that went in it was found that there was a shrinkage of 6.73 per cent. in weight. A sample was taken for analysis; the comparison of the analysis of these two samples will show what loss there may be in feeding value So far these two samples have not been analyzed. We are thus not in a position to say what the

total loss may be. The contents of the box were to all appearances as well preserved as the corn around it. In June a similar test was made with green rye; there was a little over 5 per cent. shrinkage in weight in this test.

Cost of Growing the Crop of Corn.—An account was kept of all the work and expense connected with growing the crop of corn and saving it in the silo. On account of the exceedingly wet weather in the spring, the expense of working up the land was increased somewhat, as some of it was worked up more than once. The six acres that was plowed up and re-sown added to the expense, and the crop it returned was so very small it greatly increased the rate per ton of the cost. Including all the experimental work, the cost of growing the corn came to a trifle over $2 a ton. Deducting the experimental work and allowing as good a yield on the six acres as was obtained on the rest of the field the cost was about $1.50 per ton.

4.—WINTER DAIRYING

The business of a farmer is to produce food; he may think it is to make money or to raise profitable crops that he can turn into money. But, are not all his crops food for either man or beast, or to be used in ministering to the comfort of man. The food of the land is supplied from the farm in one form or other. If the farmers' crops are good we find a prosperous year throughout the land; if, however, his crops are poor we find the reverse the case, truly he is the backbone of the country. Holding this honorable position is it not his duty, nay is it not demanded of him that he have a definite object in view in his work, and that he have his plans so laid that he may produce the largest amount of food possible from his land, that there may be happy and prosperous times throughout the length and breadth of the land. How many of our farmers are doing this? How many have a definite line of work laid out and are following it closely? Are not the large majority farming at hap-hazards, going in for one thing one year and something else the next, as changeable as the season, catching at every bauble that gives the appearance of good returns, but by the time he is ready to enjoy the returns, the bauble disappears and he is left lamenting.

Every farmer should carefully consider what line of farming his farm is best adapted to or what perhaps is of more importance the line of farming he likes best, that affords a sure and reasonable return for his outlay. Then let him make a specialty of this, develop it for all it is worth, stick to it year after year. If his choice has been reasonably made with a view to the demands of the market, he will find himself much further ahead at the end of ten years than if he had drifted about with no aim in view. It is a prevalent idea that it requires some extra ability to handle a specialty—it is not so, every man has a liking for a certain class of work; all the details of that work he masters easily—because he loves it—he thus soon becomes an expert at that species of work; but if he were doing a dozen different kinds of work would he bring them all to the same perfection he would the one? In the one case he must know *something* about a dozen different kinds of work, in the other he knows *all* about one kind. Which takes the most ability? We see this exemplified in all our large manufacturing establishments, it is all "piece work," one man does one thing and only one thing, he soon becomes so expert he can turn out double the usual quantity, etc. This is concentration of energy on one thing Our farming should take more of the nature of "piece work." "Specialty" is written all through manufacturing life, farm operations must partake more and more of that nature.

To a large majority of our farmers winter-dairying, as a specialty, offers sure and reasonably profitable returns for their labors. It will give them an aim, and without an aim nothing will be accomplished. As the specialist in the machine shop will have the latest labor-saving device, the handiest and best instruments for doing delicate work quickly and

well, so the specialist on the farm must be up to the times in his line of work, his machines must be of the latest improved pattern and his tools of the best. His cows are his machines, artifical machines you may call them if you like. Most of the cows through the country milk only during the summer and dry up as soon as the cold weather comes on in the fall, this is as nature made them. There is nothing artificial about them, the only arts they seem to be perfect in is giving as little milk as possible and boarding on the farmer six months in the year. The artificial cow is largely the product of man's mind, her latent abilities have been developed, feed, breed, care and attention have made her what she is. We can greatly improve the product from our present stock in much the same way. First the cow must calve in the fall, instead of the spring, the milking period will thereby be very much lengthened, and she will be milking at a time when the farmer will have time to look after her; he will not be so busy that he will not have time to see whether she gets sufficient water to drink or that the pasture is so scorched that there is nothing to eat. This brings us to the second change, feed, shelter and attention. A noted breeder once said, "You feed a common cow like a Jersey and you will think you have a Jersey," and he might just as well have added that if you feed a Jersey like many men do the common cow, soon all you will have left of her will be her hide, because she has not been trained to stand hard fare and starvation. Some men may tell us our cows are tender, they are fed and petted too much, stables are too warm. They would like to see a cow that was *tough* and could *rough* it a little. But all this toughness and ability to rough it is at the expense of her milk returns. Motherhood, the origin of the milking period, is in every way opposed to roughing it, it is a tender period; then again, the organs concerned in producing milk are very delicate, the third most sensitive organs of the body and most intimately connected with the nervous system. They should therefore have warm quarters, plenty of wholesome food, with the best of care and attention —feed her like you would a Jersey. It is possible in this way to nearly double the returns from your cows. It is the result of thought and skill applied to the cow to develop her latent powers. The heifer progeny of these cows, if sired by a bull of a milking strain, will be a great improvement on their mothers. "Train up a child in the way he should go," is certainly good advice for the human family. It is just as good advice to say "Train up a heifer calf in the way she should go when she becomes a cow." Now, if she is intended for a dairy cow, she should go first in the way of consuming the best milk producing foods, and second, of converting these foods into the largest possible quantity of milk—rich in butter fat—the fat being the chief valuable part of milk. Then feed your calf just such foods in order to train her organs of digestion and assimilation so that when she enters upon the real business of her life she will be able to convert as much as possible of these foods into rich milk. Feed the calf liberally so as to promote rapid growth and development, but avoid feeding her so as to make her unnecessarily fat. For in this there is danger in forming a beef tendency and habit, so that she will even take on the beef form to a certain extent more than she otherwise would, and quite likely to divert too much of her foods into the wrong channel for a dairyman when she becomes a cow. The other side of this feeding question is just as true. If the calf's stomach is injured by improper feeding the effects of it will last through her life. A habit will be formed of making a poor use of the food fed, such a cow will be an unprofitable one for a dairyman to keep.

Having the animal he wants or the artificial machine, he must have something to feed it. His cheapest feed he will find to be ensilage and soiling crops. His animals will not be suffered to scrape out a living on sunburnt pastures, but will be protected from the scorching rays of the sun, with an abundance of succulent feed before them. During the summer he will grow a lot of fodder corn for the silo that he may have feed enough to keep twice as many animals through winter as he used to do, thus furnishing work for his hired man the whole year. He will feed with his ensilage a ration of grain that his cows may produce abundance of milk which will be rich in butter fat. He will thus have products to sell when they bring the highest price on the market, for butter during the winter always brings a half more than during the summer months.

In handling the product of his cows he will ever be mindful to see that it does not

lose any value in his hands. His object will be to produce as much food as possible, and send it out in such a form that he may gain a name for his article. He will thus be helping on the whole land to prosperity, and as he sees his animals growing and developing into superior animals he himself will likewise grow and be a better man from the exercise of thought, study and the close attention to business necessary to success. He will be a more obliging neighbor, a kinder husband and father and a better christian in consequence of having exercised the care, patience and kindness necessary to rear a good dairy herd of cows.

The Dairy Herd.—At the beginning of the year the herd consisted of fourteen cows. Of these three had been milking since the last of June and one from the first of October, 1889, the other ten were bought around Harriston and brought to the dairy about the end of November. One of them came in about that time, two or three more before the end of the year and the rest, all but one, before the end of February. The exception was one which proved not to be with calf, she was afterwards fatted and sold to the butcher. So the herd really consisted of thirteen milking cows, four of them not giving much as they had been milking some time. In February one of our best milkers lost her milk through inflammation of the udder, hence from that time our number was only twelve. The majority of them proved good milkers. Each milking was weighed by itself and a record kept. In this way we know what the cows are doing. This test for the year found some of the cows wanting in quantity, as four of them were under 4,000 lb. a year. It was decided to sell them and fill their places with others. The best cow gave nearly 9,500 lb. of milk for the year. Several others gave between 7,000 and 8,000 lb.

They were fed corn ensilage morning and night, a few pounds of hay at noon. The ration for the day was 50 lb. corn ensilage, 5 lb. hay and 6 lb. meal. This food cost twelve cents a day. The cows were kept in the stable the whole time. They were not turned out to pasture until the end of May.

Ensilage as a soiling food.—All the ensilage was not fed up by the time the cows were turned out. What was left was covered and saved with but very little waste until August when it was uncovered and fed. It was found to be in as good condition as when we quit feeding from it in May. The cows ate it readily. The pastures were pretty bare so they lived on the ensilage entirely. The feed was the same as in the winter. During the day the cows had the run of a small field where there was plenty of water and shade. During the night they were in another field nearer the stable, but the pasture was no better.

Results.—Before they were fed the ensilage the cows were oeginning to fail on account of the short pasture, and had they continued on the pasture the failure in milk would have been serious, as there was no fresh pasture to be obtained at the time. The flow of milk was sustained and even increased, for at the close of a month's feeding they were giving a trifle more than at the start.

Handling the milk.—The milk was set in deep pails in ice water to raise the cream. Skimming was done with a conical skimmer. The cream kept sweet until ready to ripen for churning, which took place every afternoon. It was found we got the best results when the cream was churned at a temperature of from 66° to 68° Fahr. A Daisy churn was used. Butter was salted at the rate of about one ounce to the pound of butter. Most of the butter was marketed in Toronto. A student was sent to the dairy every afternoon for instruction, and every facility afforded him to learn the most approved methods of handling the milk, cream and butter, as well as the care of dairy stock. During the summer the cream was sent to the creamery.

I have the honor to be, Sir

Your obedient servant,

GEORGE HARCOURT.

ELEVENTH ANNUAL MEETING

OF THE

AGRICULTURAL AND EXPERIMENTAL UNION.

The eleventh annual meeting of the Ontario Agricultural and Experimental Union was held in the lecture hall of the Agricultural College, Guelph, on Thursday and Friday February 6th and 7th, 1890.

Mr. J. A. Craig, B.S.A., President of the Union, occupied the chair, and after the roll was called the minutes of the previous meeting were read and approved.

Mr. N. Monteith, Secretary-Treasurer (*pro tem.*) then presented the following financial report, which was signed by the Auditors and approved by the Associaton :

TREASURER'S REPORT.

Receipts.	$ c.	Disbursements.	$ c.
To amount on hand from last year.....	64 92	By grain experiments, fertilizers, etc	67 35
" government grant.....	200 00	" bee "	15 00
" extra membership fees on 1889 account.	12 50	" postage, telegram	19 12
" membership fees on 1890 account.....	22 50	" printing, reports and stationery.....	64 00
		" editing reports.....	35 00
		" expenses of com. to Toronto.....	5 00
		" cattle experiments, circulars, etc.....	2 05
		" balance	92 40
	299 92		299 92

THE PRESIDENT'S ADDRESS.

J. A. Craig, B.S.A., Toronto, Editor *Canadian Live Stock and Farm Journal*, then read his annual address, as follows :—

GENTLEMEN—It devolves upon me as a pleasant duty to welcome you all to our annual reunion, and this I do with all the heartiness and cordiality at my command. To our visitors we extend the free hand of friendship and invite them to reason with us on the burning questions of our agriculture, to the graduates and associates we give fraternal greetings, trusting that the old fond days of student felicity may once more be experienced unalloyed, whileto the students and professors we offer glad welcome to our consultations, hoping that the outcome of all our efforts may be reflected in some degree in our after work as well as strengthen and upbuild to a greater height of power the institution we all love to think upon, talk about, and glory in. It is one of the soundest economical truths of the age that the broad grindstone will sharpen the axe quickest, and so in touch with this, we, as a society, seek to sharpen our wits by the breadth of mind esulting from the presence of many.

A decade has swept rapidly by since this society of ours launched out on its course with the laudable and extended work before it of binding the alumni of this college together for her and their good as well as to endeavor to raise our agriculture to the status of a skilled art and sound science, and if I correctly draw conclusions from the past, and if I peer not too optimistically into the future, the years to come will be pregnant with greater results and fraught with close unity. Our caption implies that we are a union, but it fails to express to the uninformed mind the great truth round which all others swirl that we either as students, ex-students, graduates or friends of the Ontario Agricultural College, are bound together as a unit to extend the usefulness of our alma mater. Fealty to our college and her cause is the cementing material that holds together the foundation and superstructure of this union, and this allowed to weaken through oversight presages the collapse of the whole structure. The connection between our society and the college deserves a first place and the highest honor in our estimation when considering the elements that have contributed to the success of our union. It has appeared to me that in the past this desired unity of all for the good of the one, though at all times apparent, yet has never been accredited with the importance that is due it and the fruits of this are to be seen in the number of the college alumni that annually gather here. Our weakness, and it is well that we should know it, is that we cannot bring out the number of ex-students, associates and graduates that should attend ; this statement is grounded on the fact that there are hundreds of such throughout Ontario. Why is this? It may be a matter of dollars and cents with those far away, but it cannot be so with those near at hand. It seems to me that not considering their presence according to its true value there never has been a very strong bid made for their attendance. As a means of in part remedying this condition of affairs we should in our programme, give greater prominence to the discussion of collegiate matters, and through this means keep up the interest in the college in the minds of all the alumni. For some time past I dotingly mused on the pleasure I would have in broaching to you the subject of a college paper, but I am happier now in spending words that otherwise would have been used in advocating this measure, to give cheering encouragement and express warm gratitude to the active and able movers in this important matter. As the review greatly strengthens the bond of union between friends outside the college walls with those within its campus, so must it serve to make this union of ours stronger in every way. The scheme that I would have advanced would be to make it not only an organ of the O. A. C. Literary Society but of the Experimental Union as well, and it is still an opinion of mine that such a step might well be taken yet. As we are all aware there has always been a great delay in issuing our reports, and this has been the fault of the printer and not of the compiler. Being an organ of the society the results of the experiments and doings of this meeting would be made known through its pages long before it would reach the anxious experimenters through the usual tedious course. It would devolve upon the Union to bear some of the expenses of publication of the Review but that would not be considerable. This suggestion I commit to your charge. I have thought that in our brief sojourn here we do not extend our acquaintances among the students as we should. We are not here to merely criticise each other coldly from a distance and drop comments as to the evolution of the Ontario Agricultural College graduate, but we are here to know of each other and co-operate with each other in helping along our good cause. Means should be considered such perhaps as the adding of a committee on reception to our list to make our meetings more genial in that respect, and further also provide, as far as possible, for the accommodation of visiting alumni in the college. It dampens their ardor and tempers their zeal to seek the modest inns of Guelph, and I am sure that I voice the opinion of every graduate here when I say that they would willingly pay double the hotel charges to be allowed to make their home in the college while here. Repose this duty in the charge of the students and thus bind them up with the interests of the union as much as possible.

The most practical phase of our work is that of experimentation and in respect to this it seems to me better to urge a thorough development of the various lines of experiment we now have in hand rather than weaken our forces by branching off into anything

new. It has been said by Coleridge that experience is like the stern lights of a ship which illumines only the track it passes over, and we may extend this simile by saying that experiment is the brilliant headlight that illumines the path before. Agriculture has long suffered for the want of experimenters to solve the many perplexing questions of practical import that are continually cropping up, but that day is past and now we find farmers and scientists, though long estranged, brought into close contact, with benefit to both, through the medium of experimental stations and associations such as ours. That the results of experiments carefully conducted and bearing on the practice of the farm are appreciated, is reflected in the energetic efforts that are being made in the establishment of stations in all countries. In our own Ontario and the older Provinces of our Dominion the bottom has been completely knocked out of grain farming, and moreover it is a bottom that will require the best knowledge and finest skill to restore. Be it our work to do this through the medium of our experiments.

The data we are constantly collecting through our fertilizer and grain experiments that deserves emphasis by repetition, is that each experimenter determines the best fertilizer and grain for his own soil and conditions, that no experiment station can do for him. It was a timely suggestion that was made by my predecessor in regard to experiments in respect to our live stock industry, and I am pleased to know that his suggestion has been acted upon. This is a field for our Union worthy of it, for there is now in Ontario a strong reaction going on in favor of this interest, and it means that in a few short years Ontario will be the stockman's paradise of this continent, and as the interest grows the value and appreciation of our experiments will become greater.

In conclusion let me say our footpath through the labyrinth is already blazed for us, and all that we need is hearty co-operation, generous enthusiasm, and universal encouragement, and under such conditions the objects that gave birth to this society must gradually evolve into accomplished realities. Many of us rest too long after we hoe our row, but this should not be; for this Union to make permanent progress in the work before it, must ever have your interest, your best efforts, and the benefit of your counsel.

Having these, optimistic though I may be, I cannot with any degree of surety mark the limit of usefulness of this Union not only in keeping us shoulder to shoulder in the ranks of college defenders, but in elevating to a higher position in the industrial, intellectual, and social world, that industry with which we are all proud of being inseparably connected.

It was moved, seconded and carried that Messrs. Sinclair, George Harcourt and Cowan be a committee to consider the points in the President's address and report at a future sitting of this meeting.

THE MINERAL EXHAUSTION OF SOILS.

A paper on this subject, as indicated by the composition of wheat grain, prepared by A. E. Shuttleworth, of McGill College, Montreal, was read by Mr. C. A. Zavitz. When asked by your committee to prepare a paper for this meeting, knowing it would be impossible to attend, it seemed to me advisable that only members from among those attending the convention should contribute papers. This I thought advisable because your time should be most profitably occupied, and, as written articles are not clear always in every detail, no one should be more helpful during their discussion than the author himself. However, even under these disadvantages, the committee have extended to me the privilege of noting a few observations for your discussion; and a feeling of obligation to the Ontario Agricultural and Experimental Union, and an interest in the work it is laboring to advance, move me to comply with your request.

Before entering upon the subject matter of my paper permit me to make a few remarks about this society's position. The greatest recommendation it can offer is that it

aims to be useful. Such a purpose wisely directed always results in much success. In degree of time, this Union, is just entering its second decade ; while in degree of useful results, it is only commencing. Do not misunderstand me. Time has not passed in vain for the difficulties of experimental work are such that, before the best working system is established, certain experience must have been gained, and before desirable results are obtained, a system must be established. Much of this experience has been gained, and you are prepared now to complete the establishment of a "sound workable system." Why emphasise the sound workable system ? Because the varied climatic influences and the soil variations make it inevitable that, in order to arrive at definite and applicable conclusions, experiments must be continued for a great number of years and in a variety of localities. The establishment of this kind of work under these necessarily associated conditions requires careful scientific and practical direction at the outset ; and it must be pursued patiently and regularly. There may be many papers and sufficient discussion at these annual meetings since these are the easier and more popular part of our task. But the real difficult and foundation work is in performing the experiments leading to additional light that, year by year, will be added to the table of results. Its difficulty lies in the constant attention, the patience, the perseverance and the exactness involved in successfully conducting an experiment ; and it may be regarded as the fundamental work because experiments, successfully conducted, afford practical facts. These practical facts gathered from varied and numerous conditions can be profitably discussed, arranged and recorded as useful information. But, on the other hand, carelessly conducted experiments are not only unprofitable, but they are also positively injurious by misleading and wasting the time of those who may unfortunately read or discuss them. Therefore, be careful that those conducting your experiments are in these different ways qualified ; and encourage such to continue by a proper appreciation of their work.

In preparing this paper for you, I do not profess to advance or discuss what hitherto may be unknown to you, but rather to bring to your notice a few observations and facts that may lead to more light upon the conduct of partially mineral exhausted soils.

Even with a soil, naturally as fertile as the loams and clay-loams of Ontario are, exhaustion or weakening of its productive power accompanies or follows continuous cropping under what, probably at this age of scientific agriculture, may be spoken of as injudicious cultivation. Illustrations of this are afforded us from localities where grain production has been conducted since their earliest occupation, and where this has been the only or principal branch of agriculture followed. Districts in which the improvement and increase of live stock are only secondary or almost neglected. Such for instance as are designated by the name "wheat and horse districts." In many of these districts mineral exhaustion of soil exists to an alarming exten , and its effect has and is creating a great deal of restlessness among the farmers. It is perfectly obvious to all thoughtful men, practical as well as scientific, that hard cropping under bad management must in time lead to exhaustion in the soil. The nature and the manner in which it is indicated will depend upon various existing conditions of soil and soil treatment. With these I only delay in so far as they bear upon the observations to be presented in this paper.

A soil, consisting of clay-loam, has been under cultivation since 1835, and subjected to a rotation of cropping as follows :—Breaking up from sod, pease are grown, followed consecutively by oats ; turnips, with fifteen tons farm-yard manure per acre ; wheat or barley, seeded ; hay two years ; and pasture one. Occasionally, and of late years more frequently, the turnip crop was substituted by a fallow in view of cleaning. The manure applied was such as is made from the ordinary stock of a farm where hay and roots are fed, but little coarse grain, bran, oil cake, etc. This manure was applied in sufficient quantities to the above soil, and which soil now possesses an accumulation of organic matter. No mineral manures except gypsum occasionally have been used. Under this management, this soil continues to produce abundant crops of straw, hay, etc. ; but for the last ten or twelve years it has failed in one important respect. It does not produce anything like so good a quality of wheat-grain as previously. Even under most favorable climatic conditions the grain is deficient in plumpness—weight per measured bushel—and in flour producing quality. In season for instances when the yield of spring wheat

exceeds twenty bushels per acre and, generally speaking, is fairly plump, the grain will not produce a good quality of flour, *i.e.*, flour from which can be made a light and palatable bread. Yet the soil in good seasons produces increasing quantities of course grain, straw and hay.

These matters are the more intesesting because they are personal observations of facts existing under natural conditions. But one cannot regard such a condition of soil interesting in itself, but only as it reveals more clearly nature's laws, and, by indicating what greater evils may follow, leads to studies and practices enabling the soil to continue productive and profitable.

In view of this, these few observations have been made and their studies pursued as far as time and other duties have permitted. In ascertaining the cause of a revealed fact, other facts, resulting from parallel natural conditions should be included in the study. This has been done as far as opportunity afforded; and comparatively with this poor wheat, the product of the above soil, a sample from practically similar clay-loam, but which has been cultivated only ten years, is studied. By so doing, one is carried back forty-five years into the soil's natural capabilities. This similar clay-loam from which the other sample of wheat is grown is situated on the same farm, subjected to similar climatic, conditions and under similar management. But, while the former has been under cultivation for fifty-five years, the latter has been cultivated only ten years, having been cleared and broken up in 1880. Upon these two soils spring wheat of the same kind was sown in 1889, harvested, threshed and examined separately. In round numbers the yield from the former or old soil was a little over twenty bushels per acre, and that from the new soil a little over twenty-five. The straw on the old soil was probably more abundant and decidedly more inclined to crinkle and develop rust. But the grain of the new soil was brighter and plumper. Of these wheats I made rather careful examination in view of obtaining what might assist in ascertaining something of the old soil's exhaustion. In comparing the composition of these two samples of wheat for brevity and clearness, the one grown on the new soil may be called No. 1, and the other No. 2.

Spring Wheat.	Yield per acre.	Weight per bushel.	Weight of 100 berries.	Per cent. of total ash.	Per cent. of nitrogen.	Per cent. of phosphoric acid (in ash).
No. 1 (new soil)	25 bush....	60.5 lb	4.45 grams.	1.98	1.989	51.93
No. 2 (old soil)	20 bush....	58 lb	3.05 grams.	1.96	1.980	46.47

By examining No. 2 comparatively with No. 1, something may be learned regarding the nature of the defect in this old soil. To the most casual observer, although the two samples are the same variety of wheat grown from the same seed, etc., a marked distinction in plumpness and brightness would be observable. Regarding their weight No. 1, or that grown on the new soil, was decidedly heavier. By weight per measured bushel, No. 1 stood 60.5 lb. and No. 2 only 58 lb.; and upon a delicate chemical balance 100 berries of No. 1 weighed 4.45 grams, while the same number of No. 2 weighed only 3.05 grams. These weights are the average of several examples; and by them alone, according to English authority, No. 1 being the heavier, possesses higher qualities in other respects. Passing on to their composition, there is regarding total ash a percentage of 1.98 in No. 1, and 1.96 in No. 2. This cannot be called a marked difference, however, it indicates a tendency to a lower ash percentage in wheat No. 2 grown where nitrogenous matter is in excess, and mineral matter is deficient. At Rothamsted where the average for a number of years is given, the wheat grain grown upon soil made highly nitrogenous by the repeated application of ammonium salts, but no mineral manures, contained 1.82 per cent. of total ash. While the wheat grown during

the same period upon a soil in which the nitrogenous and mineral constituents were proportional contained 1.91 per cent. of total ash, likewise, pointing to the fact that a highly nitrogenous but minerally exhausted soil produces a product of lower ash percentage.

Although probably less distinct is the difference in the nitrogen percentage of these two samples of wheat, however, the examination is even more interesting; and a reference to it will be profitable. A very careful and prolonged nitrogen analysis was made, but the results at first seemed contradictory to what one would expect. The nitrogen in each is almost the same, No. 1 containing 1.989 per cent., and No. 2, 1.980 per cent. It may be well to observe that No. 2, the one a little lower in nitrogen, was grown on the old soil which, as stated before, is rich in nitrogenous manures. It seems more probable at first thought that this soil should yield grain also rich in nitrogen, being itself rich in nitrogenous manures. But after examining the ash constituents and finding that No. 2 ash was particularly low in certain of them. I compared these facts with the tables of the Rothamsted experiments. Their results go to show that mineral exhaustion may accompany excessive nitrogenous accumulation in soils, while the wheat grain product shows in a marked degree a deficiency in nitrogen. Their facts are, so far confirmed in these observations, a soil rich in organic matter producing a wheat-grain product lower in weight, in percentage of total ash and nitrogen, than the same variety of product grown upon a new soil and one evenly balanced in the elements of manure.

These facts appear to indicate mineral exhaustion in wheat producing elements in the older soil; and this opinion is strengthened after comparing notes upon the percentage of phosphoric acid. In mineral exhaustion, especially when accompanied by accumulating quantities of nitrogenous manures, deficiency in the ash constituents of phosphoric acid is of all other constituents the most marked. The analysis of these ash products show No. 1 to contain 51.93 per cent., a high average, and No. 2 to contain 46.47 per cent., much below the average, pointing unmistakably to the conclusion that the old soil is becoming exhausted in available mineral elements. With further development of the nature of this soil's exhaustion in available mineral matter greater light may be obtained. Even with these few facts lessons can be learned. For by comparing two similar products produced under similar climatic conditions, but the one upon a soil—though a clay-loam as the other—that has been farmed for almost fifty-five years, we have found a condition bearing out authoritative statements, the result of years of close and patient agricultural investigation. A condition also that appears reasonable, and that can be easily comprehended by practical farmers. A soil that with the lapse of time, and under what hitherto has been considered good management, is capable of producing crops of greatly increased bulk though in composition and maturity of grain deficiency. A deficiency that is more than theoretically interesting for it is practically unprofitable. The other soil that has been cultivated only ten years, but, otherwise, under similar conditions, produces in the same variety a plumpness and a quantity that is entirely satisfactory.

What are we to learn from these facts? We have repeatedly heard it said, "Make plenty of farm-yard manure and your land will never suffer." But this statement is too broad and undefined to be a universal guide to the farmer; for quality of manure has everything to do in determining its useful effect. Time will not permit here a consideration of what this quality should be, and besides that is pretty well known. In concluding it may be remarked that to a practical mind these few observations on mineral exhaustion of soil, indicated by the composition of wheat grain, may suggest inquiry and thought, thereby avoiding the unpleasant loss of time and means in learning by bitter experience what may be foreseen by observation. Moreover this single example illustrates a very general evil in Ontario which in time, if it should continue and extend, will mean a great loss to our Province.

The PRESIDENT—We should feel very thankful for Mr. Shuttleworth's paper as it indicates many practical points brought out.

Mr. SINCLAIR—Will purchasing wood ashes be the cheapest method of increasing ash material in old soil?

Mr. ZAVITZ—That would be a cheap method of supplying a part of the ash constituents to the soil, especially the potash. The experiments conducted by this Association have shown poor results from fresh wood ashes when applied in the spring to cereal crops. The fertilizer tests for two years now over Ontario show those used to have given the greatest increase in yields in the following order, commencing at the best: Superphosphate, farmyard manure, salt, ground apatite and fresh wood ashes, while no fertilizer came lowest.

The PRESIDENT—Wood ashes are very beneficial in gardens, especially as top dressing for onions.

Mr. ZAVITZ—Cereal crops are not usually benefited much by potash manures. Wood ashes usually have the greatest influence upon turnip, clover and other leguminons crops.

Mr. SINCLAIR—In my experience I have found ashes give good results with the oat crop, and also in the orchard.

Mr. ZAVITZ—Did you have any oats which did not have ashes applied?

Mr. SINCLAIR—Yes, and these were not so heavy and stood up better than those which had ashes applied, and which were much lodged. I have no definite figures to show the different yields from the crops.

Mr. SLEIGHTHOLM—How many bushels of ashes did you apply.

Mr. SINCLAIR—About 25 bushels per acre, and not so heavy in orchard.

Mr. HUTT—Was there any perceptible difference where the ashes were applied in the orchard?

Mr. SINCLAIR—Ashes were applied in spring. I think the fruit was better and there was a larger crop where ashes were applied.

QUESTION DRAWER.

Q. How do the feeding values of bean, shorts and wheat screenings compare in feeding value?

The PRESIDENT—I think it would pay to sell grain and buy these substitutes, if bran can be bought for $10 and shorts for $14 per ton.

Mr. SINCLAIR—In my experience I have found it best to sell some and buy some, so as to have portions of both.

Mr. DEAN—A great deal depends upon what there are to feed. If milch cows, I would buy bran.

The PRESIDENT—Dairymen are favoring feeding pea meal very much, and many strongly favor feeding meal when cows are upon pasture.

Mr. SLEIGHTHOLM—I think it would be profitable to buy bran and shorts as a change in food, but in my opinion $12 a ton is quite high enough to pay. I consider bran a very beneficial food.

President MILLS—The mixture which Mr. John McMillan, of Huron, is using this winter is as follows: Two parts pease, 2 parts barley and 1 part bran. Of this mixture he feeds about 3 lb. per day, with some ensilage and cut straw and hay in fitting steers of 1,200 to 1,400 lb. each for finishing on the grass. This ration costs from 9½ to 10c. per day. Mr. McMillan sometimes substitutes roots for ensilage. He soiled thirty head last year and likes the system so well that he intends soiling twice the number next summer. In making estimates he always reckons the manure to counterbalance the labor.

Mr. HUTT—Does he keep his animals in the stable all the time.

President MILLS—He gives exercise to his animals, as they are then better able to stand the sea voyage, but for home use he would not give exercise. He ventilates the stables when the animals are out.

Q. What kinds of soil are most benefited by lime?

A. E. RENNIE—I have had a good deal of experience in lime on very heavy soils, and it has a very beneficial effect in making it more friable, although the section in which it was used contained a considerable quantity of limestone.

Mr. HUTT—Prof. Storer says that lime acts upon the nitrogenous matters in the soils and has a tendency to impoverish soils.

President MILLS—I think if the supply of humus is kept up there will be good effect.

Q. Can we undertake live stock experiments, and should there be any remuneration for the work?

The PRESIDENT—I feel that we should let the Experiment Stations lead in this matter, and let us follow and glean the results. They have appliances that we cannot have, and can carry on this work much better than we are able to. We should verify experiments of the stations, rather than undertake much new work.

Q. When and in what form can nitrogenous manures be procured?

The PRESIDENT—I think that the best place for procuring nitrogenous manure is in the barnyard.

Mr. ZAVITZ—I expect this question has special reference to commercial fertilizers. A number of nitrogenous fertilizers can be obtained from the Ontario fertilizer companies. Sodium nitrate is one of the strongest and most readily soluble of this class of manures, and can be obtained at Smith's Falls for about $60 per ton. Ammonium sulphate is another fertilizer used considerably. There are fertilizers made from refuse of pork factories, and from wood waste which contain a good quantity of ammonia and are being tried in some parts.

Q. Can the farmers' institutes be carried on over Ontario, without taking so much of the time from the college professors?

The PRESIDENT—This is a vital question and should be thoroughly discussed here. The primary object of the institutes was to give encouragement to the local talent, but the local men have not taken hold of the institutes as they should.

Mr. BOWES—I think the professors are the ones to come out and give us information.

The PRESIDENT—I consider the farmers are relying far too much upon the professors. It is detrimental to the college and is also very hard upon the professors.

Mr. RENNIE—It is one of the best possible advertisements for the professors to go out and get a personal acquaintance with the farmers. The professors prepare themselves sufficiently for the work, but if they are taken too much from the college now, there should be other arrangements made as the institute work is continually increasing. I think far too much is expected from the college professors.

Mr. SINCLAIR—I consider that the professors are doing a work over Ontario that cannot be done in any other way. I think it is the best thing that can be done to both the college and to the farming community.

Mr. BOWES—Surely the increasing demand for the college men is the strongest point possible in having them go out.

Mr. DEAN—From the students' standpoint I would suggest that more of the ex-students should take these places; all they want is encouragement. If the farmer wants to be developed he must take hold of these matters himself.

Mr. MARSH—I think both the professors and ex-students should be sent out; they would carry weight with them, and the college would be better known among the farmers.

The PRESIDENT—We should interest ourselves in this matter. As an ex-student I would not like to have the professors lose their hold on the institutes.

Mr. ROBINSON—I agree with Mr. Dean, that too much work is put on the professors; leave the local men to swim also.

President MILLS—I have had the most of the thinking to do in this institute work since 1884. We felt there were many mistaken ideas among the farming community, regarding the college and the work done by the students. Michigan had institutes which were assisted by the professors. It was our previous custom to have two weeks vacation at Christmas and two weeks again at Easter, and after talks with the Hon. A. M. Ross, we decided to drop out the Easter two weeks and have the four weeks at Christmas—three of which could be devoted to institute work. I have no objection, personally, to dropping the work, but I feel it has been of a great deal of advantage to both the farmers and the professors, in the past. I would at the same time have no objection to severing the pro-

fessors from the institute work, but would never consent to have the professors go and come at various times during the winter. There are certain times that the institute lecturing could be done. Before Christmas there would be two weeks, and after New Years there could not be more than about four weeks. This would allow of three sets, comprising 27 institutes. We give the professors three weeks to go out at New Years, and the professors ought not to go out at any other time. I have invariably advised the professors not to go during the college sessions. If the professors go at all they must go at Christmas. How could their places be best supplied by others? I take the ground that we want to get the best men for the institutes. I know three men in Ontario away from the college whom the farmers will accept. They want a professor. The best men should be sent, and the first place should be given to the ex-student, when they prove themselves well capable for the work. The question finally comes to this: Shall we have the institutes as they now are, or sever our connections with them? In reference to the matter of having shorter Christmas holidays and letting the students home two weeks earlier in the summer, I think there is undue value put upon the two weeks in June, as it is between seeding and haying, and next to January there is no month less urgent than the month of June. In Michigan the holidays are from September to April. I would be a wonderfully relieved man if you could see your way clear to run the institutes to good advantage without the assistance of the college staff.

The PRESIDENT—There seems only two ways open to us; first to keep the institutes as they are now held in January, or second, to sever the connection of the professors from the institutes, and I would very much favor the former.

REPORT ON THE PRESIDENT'S ADDRESS.

The committee appointed to consider the President's address made the following report, which was adopted:

We, the committee appointed to consider the points taken up in the President's address, and summarize the parts which it was considered best to bring again before the meeting for their action, beg to submit the following:

(1.) That the Association devise some plan to induce a greater number of ex-students to attend the annual union meetings.

(2.) That a reception committee be appointed from among the students each year.

(3.) That *O. A. C. Review* be made an organ of the union also, and that a committee of three be appointed to meet the paper staff, and ascertain what arrangements can be done.

(4.) That there be a greater development of live stock experiments, by having not too broad a field but a definite line of work.

BARNS FOR ONTARIO.

By J. B. BOWES, PINKERTON.

"A thing of beauty is a joy forever."

A barn of beauty to the farmers of Ontario in their present pinched condition is one that will give the greatest return for money invested

A barn should be durable, convenient and safe, should be one that has stables underneath for horses, cattle, swine and poultry, also root-house, or silo, or both. The great objects to be desired in having stabling underneath are warmth, economy of labor, and, where practicable, one roof covering two buildings.

To build a barn it is not necessary to have square timber, as planks spiked together is all that is required for the frame.

Building a barn high is no barrier since rack-lifters, hay-forks and slings have come into use The height of a barn can be determined by the amount of fodder required in the stable, and the safe resistance to eighty-five mile an hourwinds.

The dimensions of a barn that I would consider of sufficient accommodation on one hundred acres of cleared land, are as follows:

One sixty feet square, with either end or side drive, and with twenty-four posts on the sides, with the roof at an angle of 45° all the way to the peak; four bed sills to support centre of frames; four bents, twenty feet apart; barn floor fourteen feet wide, twelve feet high; the feed passages of stable at right angles with the barn floor; girts every six feet, two main and four purline plates, I would consider a first-class plan of a stable. I have seen several stables spoiled, as far as the comfort of the cattle were concerned, by the space between the gutter and the manger being very short. Too short a space compels a beast to lie with a portion of the body hanging over the gutter, and in many cases I have seen the animals lie almost half way over. Especially with cows does this condition of affairs produce the greatest amount of dirt, to say nothing of the uncomfortable position. The posts to support the superstructure are in the mangers, where they are least in the way. The size of manger depends upon the kind of fodder. A convenient size for all purposes is one eighteen inches deep, sixteen inches at the bottom, and twenty at the top. The length of floor for cows of twelve hundred weight should be seven and one-half feet from passage boards to gutter. A steer can do with much less. The different rows should be made to suit the size of animals that are to occupy them. The slope on the floor if made of blocks should be at least one-half inch to the foot, cows and heifers will do with less. Stalls for two twelve hundred pounds cattle are sufficiently wide at six feet three inches clear of sides.

The silo is next the wall in the centre mow, and occupies part of the room generally alloted to roots. It is six feet wide, by eighteen feet long, and thirty-two feet high, as it extends from the floor of the stable to the main plate, and is divided off perpendicularly into three bins, six feet square, the corn to be elevated into these bins by means of the hay-fork, or slings with car on a track extending from the centre of barn floor to the silo bin, about thirty feet high. A box with a trip bottom is about the best thing to use. Those three bins will hold sufficient silage for thirty-six head of cattle for ninety-six days. I consider that this silo can be emptied from the bottom; that the immense weight will make it follow down as it is taken out, although it seems to be the experience that it will not settle. The best plan so far is to take a board or two off of the outside casing at the bottom, and fling the silage down between the inside and outside casings, portions of inside casing to be taken off as the silage is taken out.

The watering of stock without letting them out of the stall and having water in front of them at all times can be accomplished by having a metal or other cup in the corner of the manger large enough for the animal's nose, the height of water in the cup being regulated by a float valve in some part of the stable shutting off the supply. Water will rise to its own level, and the water in the cups will not rise higher than the float valve box, as the beast drinks the water flows in till it again finds its own level The chief supply of water must be higher than the top of water in float valve or regulating box.

I find from practical experience that swine can be kept in the same stable as the cattle, and produce no bad smell, if cleaned out regularly and given a fair amount of bedding. By the arrangement of passages of stable you can get from any part of root-house or silo to any place in the feed passages without opening a door.

My object in having the roof of the barn at an angle of 45°, or half pitch, all the way to the peak is to allow the hay-fork more room. By having a roof at that angle you can almost fill the barn without touching a fork full. The only real objection there is to a high barn is found when we come to thresh, it is almost impossible to get the straw up as high as the grain was formerly.

The PRESIDENT—I think it is almost universally adopted to take silage out of the top of the silo, and this is best done by means of a chute similar to the one in the silo here.

Mr. SINCLAIR—What floor have you in your stables?

Mr. BOWES—I am in favor of cedar block floor. I use it all the time. Where the cattle stand I prefer blocks, but planks where the wheelbarrow runs

President MILLS—Do you pour on pitch?

Mr. BOWES—No; I do not, the floor is ratherdamp.

President Mills—Have you used a track to fill the silo
Mr. Bowes—No.
President Mills—Is it too expensive?
Mr. Bowes—No; I consider it a very cheap construction.
President Mills—How are your stables ventilated, Mr. Ballantyne
Mr. Ballantyne—By shafts, running from the edge.

THE SCIENTIFIC PRINCIPLES UNDERLYING THE MAKING AND FEEDING OF CORN ENSILAGE.

By C. C. James, M.A., Professor of Chemistry, O. A. College.

The making of corn ensilage began in America about fifteen years ago, its development belongs to the last ten. To-day the growing of corn, the production of ensilage, and the feeding of it to stock are among the most extensive and most numerous of the experiments carried out at the experimental stations of Massachusetts, Maryland, Connecticut, New Jersey, New York, Ohio, Kansas, Missouri, Minnesota, Wisconsin, and Ontario, and it is upon the results of these that the present address is based. From the multitude of opinions and results I have carefully endeavored to separate the hypothetical from the actual, and to draw reliable conclusions based upon a wide range of experiments.

I shall divide my subject into three parts; the corn put into the silo, the process of making ensilage, the use of the ensilage thus produced.

Out of nothing nothing comes. Good ensilage can be made only from corn of good quality. What comes out of the silo depends upon what goes into the silo.

Circumstances affecting the quality of the corn are:

1. Variety of corn.
2. Nature of soil, method of preparation, fertilizers used.
3. Method of growing corn, whether broad casted or drilled, cultivated or uncultivated.
4. Season.
5. Stage of maturity at time of cutting.

The chemist is concerned principally with Nos. 3 and 5.

3. *Method of Growing.*—The general conclusion of experiments at all stations, based on chemical analysis and actual feeding tests, is that the best ensilage is produced from corn that has been drilled and not broad casted. Every stalk of corn should be grown so that it has plenty of soil room in which to develop its roots, plenty of rich soil to draw nourishment from, plenty of air-breathing space, and plenty of sunlight falling directly upon all of its leaves. The immaturity of closely growing corn depends more upon its lack of sunlight than upon any other cause.

Prof. Roberts (Cornell experimental station, New York, 1888) valued as follows:

One acre of	hay	$18 00
"	broad casted corn	19 72
"	drilled corn	35 74

4. *State of Maturity.*—This is controlled greatly by method of growing. Prof. Roberts, following out his experiments as cited above, says:—"From the above facts it will be seen that the real feeding value of the corn increased 166 per cent. after it had tasselled out, and 80 per cent. after it had nearly reached the roasting ear stage. This being so the greatest care should be taken to select those varieties of corn intended for ensilage that will fully mature before frost, in the localities where it is proposed to grow them."

Bulletin 9, 1889, Missouri experimental station, discusses the life-history of corn and contains this among many important statements, "The considerable increase between September 10th and September 17th (amounting to 24 per cent. of the total weight) indicates clearly that a crop of corn should remain in the field as long as possible, the weather permitting, to reach its greatest perfection."

Mass. Report for 1885 says, (p. 53) "One ton of green fodder corn in tassel contained in one case 307.2 lb. of dry vegetable matter; whilst in the case of the seed just beginning to glaze 463.8 lb. of dry vegetable matter are found in one ton,—a difference of 156.6 lb. in favor of the more matured state of the growth."

Mass. Report for 1886, "The ensilage of a more matured fodder corn has a higher feeding value pound for pound, compared with that cut at an earlier stage of growth."

Other experiments might be referred to, the general conclusion is that for *quantity and quality* of corn and ensilage the plants should be grown in drills and allowed to grow until the kernels begin to glaze. So long as a plant is increasing in height there will be little sugar or starch accumulated in its stalks or leaves, its compounds will be principally in a state of translocation, in a soluble form liable to easy change.

In 1884 Dr. A. Voelker, F.R.S., addressed the Royal Agricultural Society as follows:—"I feel compelled, however, to say at once that a careful and critical study of the literature of the subject, and attentive perusal of most of the original publications on ensilage in England, America and the Continent, have shewn me how scanty and imperfect is our knowledge of the complicated processes of fermentation and of similar chemical and physical changes to which succulent green food is liable under various conditions of temperature, the total or partial exclusion of atmospheric air or its free admission."

The same can be repeated with equal truthfulness in the year 1890. The changes taking place in the silo are principally changes that are classed as fermentations, and the latest English, French and German investigations of fermentations leave us in much uncertainty as to their nature and conditions. From the conflicting opinions and the varying results I have selected a few results that are the unmistakable outcome of a large range of experiment and experience.

1. *Loss.*—There is a loss of valuable plant material due to the chemical changes taking place in the silo. It will vary from a very small per cent. to one-half of the dry material of the corn. The loss will depend upon the condition of the corn placed in the silo and the fermentation taking place. The substances lost or used up will be in the following order:—Sugar, starch, fibre, nitrogenous compounds. The distinction of these constituents will be accompanied by the production of acids (carbonic, lactic, butyric, acetic, etc.), so that the acidity of silage is a fair test of the loss sustained, and the production of as sweet a sample as possible is both advantageous and economical.

2. *Production of Acid.*—We have just stated that this is carried on at the expense of the most valuable portions of the corn. The difference between sweet and sour silage is one of degree of acid, varying in sweet ensilage from .02 per cent. to .50 per cent. of acid to 2.0 per cent. or over in sour ensilage.

Now let us look at some of the conditions controlling acid production, for in understanding them and following out their conclusions lies the difference between sweet and sour, good and poor ensilage.

(*a*) *Water.*—Ordinary fermentations are carried on in solutions, in presence of water. Matured grains, straw, well-cured hay, succulent foods thoroughly dried, manure deprived of all of its moisture will not ferment. Even concentrated solutions ferment but slowly. It would seem that when the plant is young and succulent when the amount of water rises much above 75 per cent. that the cells are in their most favorable water condition for fermentation. Water is not only a favorable medium in which the fermenting cells develop most vigorously, but is also demanded for many of the chemical changes, many fermentations being processes of hydration. To retard acid formation therefore, save loss of food, and make sweet ensilage the material put in should not be too succulent.

Conclusion.—For sweet silage use well-manured, or partially dried and wilted corn.

The amount of water in the corn depends upon the state of maturity, the method of growing and the treatment at harvesting.

CORNELL EXPERIMENTAL STATION, DECEMBER, 1888.

Period.	Date of Cutting.	Per cent. Water.
I	July 24	89.34
II	Aug. 8	83.57
III	Sept. 3	73.93

"It will at once be seen that the most marked difference in the compositionrof the fodder cut at the different periods consists in the constant and rapid decrease in the amount of water."—(Prof. Roberts.)

MASSACHUSETTS EXPERIMENTAL STATION REPORT, 1885, p. 52.

FODDER CORN AT DIFFERENT STAGES.

—	July 22.	July 29.	Aug. 5.	Aug. 3.	Aug. 27.	Sept. 3.
Water	88.61	85.76	84.64	82.08	81.15	76.81
Solids	11.39	14.24	15.36	17.92	18.85	23.19

The crowding of corn together also has the effect of retarding growth and maturity, and, in most cases, of increasing the water per cent.

ONTARIO EXPERIMENTAL DAIRY DEPARTMENT, 1888.

Drilled corn, 81.32 p. c. water broad casted corn, 83.61 p. c. water.

In favorable weather wilting upon the ground will have the effect of reducing the water per cent. and also of effecting changes (as many advance) similar to hay making or curing.

(*b*) *Condition of Maturity.*—"The marked increase of nitrogen free extract (members of the starch family) as the corn matures, and the progressive decrease of acid in the ensilage, show how greatly the corn improves as it approaches ripening. The relatively large amount of water and crude fibre in the young plant justifies the epithets 'slush' and 'swill' as applied to the ensilage from such material." (Michigan Experimental Station Report, 1889). This statement accompanies a table of analyses of ensilage from which the following is taken :

No. 1, Aug. 25, wilted two days, then ensiled, 1.10 per cent. acid.
" 2, " 27, put in fresh, 1.02 " "
" 3, Sept. 1, wilted two days, 0.95 " "
" 4, " 3, put in fresh, 0.91 " "
" 5, " 8, wilted two days, 0.87 " "
" 6, " 10, put in fresh, 0.80 " "
" 7, " 13, put in fresh, 0.81 " "
September 14, killing frost.

Prof. Henry, of Wisconsin, says, "In regard to making the so-called sweet ensilage the main point appears to be to have the corn well ripened, ready for early cutting and shocking. Corn ripened so that the grain begins to dent will make sweet ensilage even if the silo is filled in a single day."

The more matured a plant, the more fixed, less changeable are its constituents, *i e.*, the constituents of a young plant will suffer change or decomposition more rapidly than those of the same plant more matured.

(*c*) *Temperature.*—Mr. George Fry, of England, in his work "Sweet Ensilage," laid great stress on the necessity of raising the ensilage to 122° F., thereby to stop the various ferments. The most favorable temperature for the development and working of the various ferments is about 95° F., and most of them cease at 122° F., but some continue active to 140° F. Fry says that excess of water in succulent food prevents this rise of temperature and that sour ensilage thereby results, as the ferments are not then destroyed.

In opposition to Fry, Prof. Alvord, of Maryland Experimental Station, says, "Temperatures 110° to 140° F. are most favorable for their development and activity, and it requires at least 185° F. to destroy them, while fermenting ensilage does not often exceed 140° F., and no authentic record of 150° F. can be found."

Along the same line Prof. Johnson, of Michigan, says, "I am of opinion, however, that positive evidence to sustain this theory is almost if not entirely wanting. Enough careful work has not been done to demonstrate it beyond question."

Amid conflict of opinions I think that, taking the conclusions of scientific experts as our guidance, we are warranted in the conclusion that though we cannot expect to raise the ensilage to such a temperature as to cause all ferments absolutely to cease work, nevertheless we can retard greatly their action and control somewhat the souring of the ensilage. There is along this line room for investigation on the part of our interested young agriculturalists of a scientific turn of mind.

(*d*) *Method of Filling.*—Whether slowly or rapidly, whether wilted or unwilted, this will be partly controlled by the weather, but there seems to be something of more controlling influence back of this. The effect of the method will perhaps have more effect on the aroma or flavor of ensilage than upon its acid production.

(*e*) *Exclusion of Oxygen.*—Presence of air is of course necessary for the beginning of many of the fermentations, but, once commenced, absence of air will not necessarily destroy them. The exclusion of the air is of most importance in the case of ensiling young and succulent fodder.

3. *Effect on Protein.*—This is the muscle and flesh forming portion of the plant, hence the effect on it is worth considering. Michigan Experimental Station, Bulletin 49, May, 1889, states, "A small loss of crude protein is common in the silo, but the change from albuminoid to amide condition of the nitrogen compounds is the most striking feature of ensiling. These two facts point to a loss of value in ensilage as compared with the fresh corn stalks, or even the dry material when it has been rapidly and perfectly cured."

The same conclusion was arrived at by Dr. Voelcker in '86-'87, and reported upon to the Royal Agricultural Society of England, Report XLVI, p. 403. Silage was made from grass and compared with hay from the same. "The total loss due to fermentation, evaporation, etc., in making the silage was 7.29 per cent. on fresh grass, of this 3.25 per cent. consisted of water. The loss of total nitrogen when, as here, no drainage is allowed to flow away, is very slight; but the nitrogenous bodies have undergone considerable change from the albuminoid to the non-albuminoid condition. The woody fibre, as indeed the whole of the fibre, has been diminished, insoluble albuminoids are lessened, and the soluble albuminoids increased. In the hay the nitrogen has undergone but little change."

Put in silo 151 lb. (n. compounds), 123 lb. alb'd, 28 lb. amides.

In silage 155 lb. (n. compounds), 73 lb. alb'd, 82 lb. amides.

The most extensive tables of analyses of American fodders are those compiled by Dr. Jenkins of Connecticut. The table below gives his average of 59 samples of ensilage and the maximum and minimum amounts of the various constituents. To his table I

have added 41 analyses, gathered lately from a wide range of reliable sources, and give the average of 100 samples that I thus obtained :—

——	Water.	Crude Protein.	Fat.	Soluble carbo-hydrates.	Crude Fibre.	Ash.
Maximum	87.00	2.80	1.80	22.30	10.00	
Minimum	64.40	0.70	0.20	5.10	3.00	
Average, 59 samples	80.28	1.52	0.70	10.49	5.70	1.31
" 100 "	79.83	1.56	0.73	10.62	5.94	1.29

Water.—The water varies from 64.4 to 87.0 per cent. From our investigations it appears that the best, the sweetest, and the greatest amount of ensilage will be produced when the amount of water lies near 75 per cent., between that and 80 per cent.

Crude Protein.—In food analyses, this of course includes the less valuable amides, which are not flesh and muscle formers, but heat producers. The following table gives a few analyses separating the true protein from the amides or non-protein. I have said before that in the silo true protein will be changed to amides to a certain extent ; this, in addition to the amides always existing in young growing plants, will give us a high per cent. of non-protein :

——	Total crude protein.	True protein.	Amides or non-protein.	Per cent. of true protein.	Per cent. of non-protein.
New York, 1886	0.85	0.50	0.35	58.83	41.17
" "	0.85	0.45	0.40	52.95	47.05
" "	1.08	0.75	0.33	69.45	30.55
" "	1.17	0.73	0.44	62.40	37.60
Wisconsin, 1888	1.92	0.99	0.93	51.58	48.42
Dr. Voelcker, 1884	1.12	0.68	0.44	61.10	38.90
Pennsylvania, 1889	2.15	1.43	0.72	66.52	33.48
" "	2.35	1.75	0 60	74.47	25.53
" "	2.43	1.98	0.45	81.48	18.52
" "	2.34	1.60	0.74	68.42	31.58
Michigan, 11 analyses, 1889	1.32	0.82	0.50	62.12	37.88
Average				63.36	36.64

German investigators have found non-protein in considerable quantities in roots, potatoes, malt sprouts, and fodder plants of all kinds, the average in the last case being about 30 per cent. In four analyses of malt sprouts Kellner found an average of 27.40 per cent. (Armsby). The average so far found in corn ensilage is in excess of that usually found in the freshly gathered plants, and this large quantity of non-protein, to a certain extent, takes from the value of the ensilage and demands a liberal addition of nitrogenous foods to it to make complete rations.

Fat.—There is little or no true fat in corn ensilage, unless it be made from corn well matured. The fat represented in our tables is ether extract more properly and consists largely of chlorophyll, waxy matters and acids. The amount of fat, therefore, may be considered as of little or no value.

Much difficulty meets us here; there are few determinations with wide differences. I give the digestion co-efficients available:

——	Moser. (Germany.)	Armsby. (Pennsylv'a)	Woll. (Wisconsin.)	Sturtevant (New York.)
Protein	73	41	78	49
Fat	75	86	53	90
Carbohydrates	67	66	56	67
Fibre	72	60	74	69

Reference to the reports of work done at some U. S. stations, especially at Wisconsin and Pennsylvania during the past two years, clearly shows that there is good work to be done in determining the exact feeding value of corn ensilage in comparison with corn fodder. Some contend that ensiling lowers the digestibility of some portions of the food, fibre for instance. The variability of results arising from variety of methods adopted to determine this leaves the question as yet to be settled.

——	Water.	Protein.	Fat.	Soluble carbo-hydrates	Fibre.	Ash.	Nutri-tive ratio.
Colostrum	71.7	20.7	3.4	2.5		1.8	1:0.5
Whole milk	87.0	4.0	3.7	4.6		0.7	1:3.3
Grass	75.0	3.0	0.8	13.1	6.0	2.1	1:7.0
Corn ensilage	79.8	1.6	0.7	10.6	6.0	1.3	1:11.0

Nature's feeding is from colostrum to whole milk to green grass. By consulting our table we see that corn ensilage is alone not sufficient to take the place of either whole milk or good pasture grass, that the great lack is in nitrogenous constituents, flesh and muscle formers, and that the use of ensilage in a ration demands the addition of foods containing protein and fat, such as good hay, grain, bran, cake, in such proportions as must be regulated by the circumstsnces of the feeder and market prices. Let us now contrast the ensilage with the German feeding standard for milk production, which is the best established of the standards. Though these standards cannot be closely followed in this country, they will serve to show the great lack in the ensilage for milk production which must be supplied as above stated. I take the highest digestible co-efficients (Moser's)

——	Organic sub-stance.	Digestible Substances.				Nutri-tive ratio.
		Protein.	Carbo-hydrates	Fat.	Total.	
German standard for milk	24.0	2.5	12.5	0.4	15.4	1:5.4
120 lb. of corn ensilage	24.2	1.4	13.7	0.5	15.6	1:10.1

Thus it would require 120 lb. of ensilage per 1,000 lb. live weight, daily, to give organic substance equal to that demanded by the German standard. The two noticeable features are, the lack of protein and the great mass of ensilage. The general conclusion of the American experiments is that in profitable feeding the daily allowance will not exceed 50 lb.

In conclusion, let me state requirements met by the ensilage :—1st. It is succulent and palatable. 2nd. It gives bulk for ruminants. 3rd. It contains heat and force producing constituents. 4. It may contribute somewhat towards fat production. 5th. It should, pound for pound, a little more than take the place of roots. 6th. It is regulating and tonic in its effects upon the animal system.

CHEMISTRY OF DAIRY PRODUCTS.

By A. E. Rennie, of Hamilton.

In examining the composition of blood and milk the large amount of water they contain, is at once noticeable, there being in the maximum only 15 per cent of solids.

Empires like milkmen have risen to greatness, in proportion to their water privileges. In the case of the milk dealer, however, it is often in the inverse ratio, in relation to true greatness.

What would Egypt, Greece or Italy have been without the grand water highways which surrounded and penetrated them? The mighty rivers and the great lakes of Canada were the cause of her rapid immigration and advancement.

Men follow, nature leads.

Man found water a more convenient freight bearer than land, and therefore used it as a travelling route.

He found water a good heat conveyer, and therefore boasts of the hotwater system of heating.

Long before the first ocean grey hound crossed the intervening water, the pioneer voyageur ran a rapid, or a Roman galley left the Tiber, nature used water as a freighting medium.

Stratified rock exemplifies how materials were disintegrated, floated, precipitated in ages past.

The rounded boulders in our fields shows us that all things need recreation.

The Scotchman can point back to these monuments of glacial action, as proof that curling is the most ancient of games, nature having introduced the sport in ages past.

The avenues of the work of water are not to be found in this organic world only but are exhibited in the water vascular system of the lowest echinoderm and the circulatory system of the highest vertebrate.

The whole organism is a sea port town, and like a double track railway there are separate ways for incoming and outgoing cargoes.

At the lacteal vessels the blood is freighted with dissolved nutritive substances from the food. At the "long port" the little blue incoming boats discharge their heat giving material, and take in oxygen, thus becoming red vessel outward bound. Every hundred volumes of blood carries twenty-two volumes of oxygen.

Look at the circulation of the blood : Can any engineer propose or put in execution a process of heating better than this old plan.

Don't brag of the discovery of the hot water system of heating, it is as old as the vertebrates.

Water of the blood and milk depends for its purity upon the source from which it is obtained. If water is obtained from fermented, or putrid food, it will contain germs that will originate fermentation. I canvas not your opinion, gentlemen, whether you are

pessimists, and believe life is degenerating, or whether you believe in the survival of the fittest and that the organic mechanism is still making upward strides; but simply state that if you expect a cow to act as a successful garbage filter; you have overestimated cow nature, for the milk product will contain the ferments of putrefaction and disease.

The person who is not political economist enough to believe in division of labor, to the extent, that the man who delivers milk and the man who collects garbage from his yard should not be one and the same man, has missed his calling in life, for he should travel and see the world. Yes! See the world with Barnum.

A dairy farm drew water from a certain pond; within 22 paces of the same pond at a higher level a ditch ran in which a sewer from a village discharged its contents. The result was that diphtheria broke out in the village, the attacks and fatal cases being in the families of the customers of this dairy farmer.

A bad epidemic of sore throat was clearly traced to the prevalence of this disease among cows in 1883 in Dover, England. Four hundred cases of sore throat occurred in a week among the customers who received milk from the diseased source. Authentic evidence shows that water from a diseased origin is dangerous.

The fat of milk is complicated as to its constituents being composed of a mixture of a number of hard and soft fats. The specific gravity of this fat at 100 ° F. is from .912 to .914 the melting point being 96.4 ° F. The specific gravity and melting point of milk fat changes to some extent according to the nature of the food the animal consumes while producing the milk. Some believe that in the elaboration of milk, the fat is given off from the gland follicles by a process of budding. I don't say it laughs and grows fat. Half such an undertaking is enough.

It was naturally supposed that the fat in milk was derived from the fat of the animal's food; but investigation has proved that the fat in the milk exceeded the fat in the food.

Opinion is likely to run to extremes; the prevailing idea at the present time, being that the fat of the food is used up in producing force and heat, and is therefore not identical with the fat in milk.

Fat stored up in the body receives its character from the food producing it. Pigs fed on oily nuts, mast, etc., exemplifying this fact, the flesh being oily and unfirm. Experimenters have come to the conclusion that a high per cent. of oil in food depresses the activity of the milk gland. This might be due to too great a change in the food, the animal showing different results if educated up to the extreme change. It is a well-known fact that the emulsification of fat in the body is produced by the bile; and that a too rapid increase of fat in the food is liable to be followed by an excessive secretion of bile, causing biliousness. The consequence of this being that the system would be disturbed, and the production of milk interfered with to some degree. The fact that northern cows cannot stand being fed on the crude cotton seed, while southern cows can eat it in considerable quantities, may be due to the amount of oil it contains, its high per cent. of albuminoids, or the medicinal effect of the cotton plant itself.

The melting point of butter from milk of cows fed on cotton seed is remarkably high, while cotton seed oil solidifies only when cooled near the freezing point of water. This would indicate that the fat in the milk was due to the albuminoids of the cotton seed and not to the oil it contained.

The size of the globules of emulsified fat has an important bearing upon the creaming of milk. The large globules of the Jersey and Guernsey allow the milk of these breeds to show at their best, the per cent. of churning butter being large, on account of the ease with which the large butter globules rise through the milk. The Ayrshire and Holstein breeds are at a disadvantage, on account of the butter globules being small. This milk requires more skill to extract as butter as large a per cent. of the fat present in the milk.

When we commence to study milk under this heading we are struck with the wonderful provision nature has made for the development of off-spring. Starting from the blood, we note the great changes exhibited between it and the colostrum (or first milk), and between this and normal milk. In the colostrum, there is ten times more fat than there is in the blood serum. The young animal requiring heat producing food

to keep up the temperature of the body. In normal milk there is an increase of twenty-two times as much fat as in the blood, that being twice as much as in the colostrum. The calf on account of its active life requiring a force producing food. This is where nature and the boy that took the calf to the market disagreed. The calf was on one end of the rope and the boy on the other. The calf would go ahead at a rate that made the boy think it was competing with an express train, then it suddenly stopped and the boy sat down as suddenly. The boy thought the animal had too much energy and certainly didn't need food to produce it.

Mr. E. Smith of N. Y., who has written on food, says "that ten grains of butter burnt in the body, produces heat sufficient to raise 18.68 lbs. of water 1 ° F."

Prof. Atwater says, "that if 1-28 of an ounce of fat is consumed in the body, it will (if it be transformed into mechanical energy such as the steam-engine or the muscles use to do their work), furnish as much as would raise one ton fourteen and two-tenths feet, or 14 2-10 tons one foot. Mr. Zavitz suggests that the fat must have been strong."

The fat in milk does not saturate the other solids. If such was the case, the fat would prevent the solids being acted upon to any advantage by the juices of digestion; but the facts are just opposite, for the fat is presented in the milk in the form of an emulsion, ready to be passed into the circulation.

There is less than five per cent. of sugar and extractives in the blood. In colostrum there is 1.34 per cent. which realized three times as much as in the blood; and normal milk contains ten times as much sugar as the blood. The reason of this increase is to supply heat and force giving material equal to the demand in calf life, occasioned by its prominent characteristic, namely—activity.

Milk is the only known substance that contains sugar in the form of lactose.

Milk sugar is remarkable for its grittiness, its lack of sweetness, and its power of resisting the attack of certain ferments among which is the *butyrie facillus.*

The effect of milk sugar to the dairyman is of great moment, indeed, it is the highway of friend and foe.

Ferments may be conveniently divided into two classes:—1st. *Pathogenic* (disease producing) and, 2nd. *Non-pathogenic.*

In speaking of the *non-pathogenic* ferments, it is convenient to divide them into two classes, those that develop in a neutral or alkaline solution and those that require an acid medium in which to increase.

It is known that there are from 30 to 40 *non-pathogenic* species of *bacteria* that grow, and produce certain changes in milk and cream.

It is a common practice in farm life, to subdue weeds by crowding them out, by keeping the land covered by some economic crop. Buckwheat is often used for the purpose indicated above, because it covers the ground with a luxuriant growth, and because its roots seem to have an antagonistic effect on other plant life. The dairyman in producing butter and cheese uses certain ferments for a similar use. The ferment that produces the ordinary souring in milk, is called "*Bacillus acide lactici.*" It is the most commonly known of all the ferments in milk and cream. It produces its action by attacking the milk sugar and converting it into *lactic acid.* It multiplies best in a neutral or slightly alkaline solution. Its growth is slow in a dilute acid solution and is prevented entirely when the acid is increased to .8 per cent. On account of the above fact only a portion of the sugar in milk can be changed to acid. To the unskilful butter and cheese-maker, the *lactic* ferment is the personification of all evils; while to the scientific and painstaking it is a friend at all times. The *butyric bacillus* is the dread of the butter-maker, for to it is attributed the condition prevalent in 10c. butter. This ferment cannot increase the presence of free *lactic acid.* The cheese-maker knowing that the ferments which produce this effect known as "ripening" in cheese increase but slowly in the presence of *lactic acid,* manipulates the curd in such a way that it will retain just the proper amount of acid. The consequence being that there is a very gradual change due to certain ferments that have the power of making the *albuminoids* more soluble, and consequently more digestible. If the cheese-maker is unskilled and allows too great a development of *lactic acid,* before he draws off the whey the curd will be hard and

dense, digestive fermentation impossible ; and the resulting cheese will be heavy, wanting that porosity and rich cheesy smell that characterises marketable cheese.

The ash of milk is composed of phosophates of iron, potash, lime and magnesia ; and chlorides of soda, potash and lime. The coagulating action of rennet on casein, will only take place when the neutral phosphates are present. The ash in colostrum is nearly double that in normal milk. This being necessary to satisfy the needs of the calf whose bony tissues need ash constituents.

There are three main classes of albuminoids in milk, albumen, casein and fibrin.

The albumen in normal milk is about one-fifth of the casein present. In the colostrum it is increased to the extent that it reaches 60 per cent. of the total solids present. Albumen will not coagulate under the action of rennet or acid, but is coagulated by heat. It is closely identified with blood albumen ; there is less of it in the blood than in normal milk, however. Nature seems to increase it in the colostrum for the purpose of medicine and on account of its fine division to give the juices of the stomach a better chance of action during the period of its first secretion of digestive juices.

The viscosity of milk is largely due to the albumen, and nature has produced it for the very reason that dairymen wishes to get rid of it.

Nature has for its object the presentation of milk in a form that could be best acted upon by the digestive system, therefore milk was made viscose to prevent the fat globules from clustering, and by massing interfere with the easy digestion of the other solids, and also necessitate a secretion of bile to again emulsify this fat before it passes into the blood.

The dairyman on the other hand wishes the fat to cohere and thus become larger in its globules so that the creaming will be more rapid. There is a point for discussion here, therefore the cheese or butter maker does not want fibrin in the milk, the butter maker for the reason about creaming. The cheese-maker would appear to want it to keep as much fat as possible held on the solids of milk, but another fact comes in here. The albumen would coagulate with rennet, but on coagulating with heat it produces difficulties in cheese manufacture and even after manufactured it leaves the cheese so open to the attack of ferments, that the cheese changes rapidly and is anything but what would be termed "of good shipping quality."

Casein, by the best authorities, is said to be manufactured from the albumen of the blood. The reason for coming to this conclusion, is that when by disease or excitement the body is thrown out of its normal condition, the casein is greatly diminished in the milk and albumen predominates.

Albuminoids in the form of casein are present in no other substance than milk.

Casein of human milk coagulates in a very fine state, producing much surface to the attack of the juices of digestion. The casein of cow's milk coagulates in mass, holding the globules mechanically. The smaller the globules of fat the easier they can be held by the curd, and the fewer of them will escape from it, so that Holstein and Ayrshire milk is well adapted for cheese making. The casein holds the phosphate of lime in true combination. The late Prof. Arnold held that if the curd was left too long before the whey was withdrawn, the phosphate became separated from the casein. The cheese losing in weight and food value that valuable ash constituent.

It is the opinion of the best authorities that fibrin does not exist in the normal blood previous to its being shed, but is the result of the union of fibriogen and paraglobulin.

These compounds may, with proper management, be precipitated from the blood without union. The coagulation of blood is due to the formation of fibrin, which encloses the blood corpuscles in its net work of threads.

Blood contains 2.2 to 2.8 parts of fibrin in the 1,000.

Coagulation is promoted by—

1. Exposure to air.
2. An increase of temperature slightly higher than the living body.
3. Contact with foreign substance.
4. Agitation.
5. Addition of minute quantities of common or other neutral salt.

Coagulation is delayed by —

1. Cold.

2. Certain chemical reagents in sufficient quantity. Among these are common salt, caustic alkalies, magnesium sulphate (epsom salts), potassium nitrate (saltpetre).

Dr. S. M. Babcock of the Wisconsin Agricultural Experimental Station, has made some very valuable investigation in regard to fibrin.

In Bulletin No. 18, it is stated that milk contains fibrin to the extent of about 1-500 of that in blood, or two or three parts in every ten thousand of milk, the fat in the whole milk.

Cream 99.3 per cent. fat of milk. Skim-milk 7 per cent. fat of milk.

If the milk is not quickly chilled with ice water fibrin will form rapidly, so that in thirty minutes the milk be in such a condition on account of the formation of fibrin, that if it then be immersed in ice water at 40° F. it will only yield up fat as follows :—

Cream 91.2 per cent. fat of whole milk.

Skim-milk 8.8 per cent. fat of whole milk.

Contrasting this with the other method of rapid milk setting, *there is a loss of 8.1 per cent. of fat.*

This necessitates a loss of 8.1 per cent. of the butter made by the farmer, resulting in *a loss of 8.1 per cent of cash for* butter that could have made.

When there is such a cry "that farming does not pay," it is worth while to use better methods of work. In this one case for the butter.

It is contended that fibrin in milk is in the form of a network of interlacing particles, as in blood, and that the creaming of milk is retarded by the fat globules being caught in the fibrin, an impediment in the rising of the fat being caused to such an extent that almost all the fibrin is carried up into the cream layer ; the result of the above being that the cream raising is slow and a quantity of small fat globules never reach the top.

This fact is exemplified by experiments and in practice from Prof. Henry's investigation (Wisconsin exp. station), and from results of daily practice in actual dairy work it is shown that if normal milk in gun shot cans be immersed in ice water at 40° F. directly after it is milked (say while at 90° F.) the result attained shows that the farmer has a chance to increase his output in butter 8 per cent. Business men consider 8 per cent. a very good interest.

Experimental stations and such unions as this, gentlemen, have the high honor of investigating and bringing forward improved methods, and I believe the present depression in farm life is not to be looked upon with despair. It is "a dark cloud with a silver lining," which will force the ignorant, careless and timid to strike out for more knowledge. The institutions of agricultural education will be recognised in their true merit, and the farmers of Canada will press for more and more research in regard to the unknown in the field and the dairy. The conclusion of the whole matter being that the Canadian farmers will supply Canadian markets, and cope successfully in supplying the foreign, especially the British market.

HORTICULTURAL EXPERIMENTS.

The following report is a synopsis of the experiments in potato culture for 1889, showing in a concise way the results obtained by the different persons who undertook the work. The committee deemed it advisable to leave out No. 3, small, eyes cut out but one, and No. 4 medium, cut in two, as there was a loss of time in preparing the former, and an extravagance in bulk of seed. The following circular was sent to experimenters, together with a blank form for report :—

GUELPH, April 5th, 1889.

DEAR SIR,—It has been decided by the Horticultural Committee of the Ontario Agricultural and Experimental Union to carry on the following experiments with potatoes. We shall be pleased if you will conduct these experiments and report results.

No. 1. planting large whole potatoes.
" 2. " small uncut potatoes
" 3. " medium potatoes, fresh cut, 2 eyes.
" 4. " " " old cut, (5 days), 2 eyes.
" 5. " " " cut, with 1 eye.
" 6. " " " seed ends.
" 7. " " " fresh cut, 2 eyes, cultivated flat.

Nos. 1 and 2 to be planted 20 inches apart in rows. Nos. 3, 4 and 5 to be planted 8 inches apart in rows. Plant that variety which does best with you. Potatoes to be planted on 6 adjoining rows, where land is uniform. Give same manure and cultivation as rest of the field. Each row to be 7 rods long. In digging be careful to weigh accurately, and forward results as soon as possible to

N. J. CLINTON, Windsor, Ont.

Report at earliest convenience if you will undertake the work.

ONTARIO AGRICULTURAL AND EXPERIMENTAL UNION.

	Answers.	No. of Row	Weight of crop lb.	No. of lbs. small potatoes under 1½ inches in diameter.
Give date of planting.....				
" date of digging.....				
" Crop in 1888.....				
" Crop in 1887.....				
" Weather.....				
" Variety.....				
" Surface Soil.....				
" Subsoil.....				
" Distance between rows.				

What is your usual way of preparing seed for planting?.....
How do you cultivate your potatoes?.....
Name.....P. O.....

The following are a few conclusions we can draw from this and the preceding report for 1888 :—

1. That there is not any advantage in keeping potatoes cut for seed any length of time before planting, for in both cases the returns are less than from the fresh planted seed.

2. The planting of the large whole potato 20 inches apart in rows gave better results then when planted 12 inches apart.

3. A person not having time to cut his potatoes will not lose anything by planting them whole, especially large and medium sized potatoes, for they gave returns of 43.2 bushels more of large or marketable potatoes than any of the six rows and 29.6 bushels more potatoes than any of the six rows after the seed was deducted from the total yield, No. 6 being the next highest.

4. No. 4 gave second greatest yield of marketable potatoes out of six rows, No. 6 second, No. 2 3rd, and No. 5 4th.

REMARKS.

The additional experiment No. 7 was added on after the plan of the experiments was printed and only three tried it, and as two of the three experiments gave the heaviest returns it would not be fair to deal with it among the averages, but only as the three individual experiments. One reported the sample as extra large.

The light yield as compared with that of 1888 was largely owing to the early wet season followed up by a long spell of dry weather in most localities during the season.

J. HOYES PANTON,
ELMER LICK,
N. J. CLINTON. } Committee.

Result of Potato Experiments for 1889.

Experimenters.	Variety of Potato.	Large w			Small uncut.			Fresh cut, 2 eyes.			Old cut (5 days) 2 eyes.			Cut with 1 eye.			Seed ends.			Two eyes. (fresh cut) flat cultivation.			Average seven kinds.		
		1.			2.			3.			4.			5.			6.			7.			—		
		Lar. lb.	Sm. lb.	Tot. lb.	Lar. lb.	Sm. lb.	Tot. lb.	Lar. lb.	Sm. lb.	Tot. lb.	Lar. lb.	Sm. lb.	Tot. lb.	Lar. lb.	Sm. lb.	Tot. lb.	Lar. lb.	Sm. lb.	Tot. lb.	Lar. lb.	Sm. lb.	Tot. lb.	Lar. lb.	Sm. lb.	Tot. lb.
J. H. Esplin	Earl. Rose	65	30	95	42	26	68	39	20	59	28	7	35	43	14	57	32	21	53	....	....	....	41.5	19.6	61.1
Elmer Lick	White Elephant	34½	17½	52	29½	12	41½	31	11	42	31	14	45	23½	9	32½	14½	9	23½	32	7	39	28	11.3	39.3
Isaac French	.....	155	20	175	115	15	130	73	9	82	68	12	80	87	14	101	83	17	100	91	21	112	96	15.4	111.4
Edgar M. Zavitz	White Elephant	52	18	70	47⅓	7	54½	45	5	50	43	6	49	....	....	....	....	....	....	....	....	....	46.8	9	55.8
George G. Sherriff	Early Rose	44	6	50	54	8	62	62	7	69	29	4	33	40	5	45	76	12	88	....	....	....	50.8	7	57 8
R. C. King	Late Rose	38	25	63	18⅜	16⅓	35¼	13¾	21½	35¼	18⅞	29½	48⅓	19¼	19¼	38½	21½	25	46½	....	....	....	21.6	22.7	44.3
Jas. Forsyth	Beauty of H ron	192½	9½	202	72	13	85	173	12	185	96	9	105	108½	8½	117	128½	10½	139	114	9	123	126.3	10.2	136.3
Average yield one row (7 rods)	.....	83	18	101	54	13.9	67.9	62.3	12.2	74.6	44.8	11.6	56.4	53.5	11.6	65.1	59.2	15.7	74.9	79	12.3	91.3	58.7	13.6	72.3
Average seed used per acre	1889	Bush. 33.2			Bush. 8.7			Bush. 14.4			Bush. 14.4			Bush. 8.2			Bush. 8.2			Bush. 14.4			Bush. 14.5		
	1888	55.5			14.4			14.4			14.4			8.2			8.2			.....	....		19.1		
Average yield per acre	1889	212.1			142.8			156.7			118.4			136.7			157.5			190.7			159.3		
	1888	263.9			216.0			213.9			209.1			197.3			207.4			.....	.....		220.6		
Net yield per acre (less seed)	1889	178.9			134.1			142.3			104.0			128.5			149.3			176.3			144.8		
	1888	208.4			201.6			199.5			194.7			189.1			199.2			.....			201.5		

SECOND DAY'S PROCEEDINGS.

The nominating committee presented their report, and the Association elected the officers for 1890–91, which were as follows.

OFFICERS FOR 1890–91,

Hon. President, Prof. T. Shaw, O. A. College, Guelph.
President, T. G. Raynor, B. S. A., Rosehall, Prince Edward County.
Vice-President, J. J. Sinclair, Ridgetown, Kent County.
Corresponding-Secretary, G. A. Brodie, Bethesda, York County.
Secretary-Treasure, A. Shantz, Waterloo, Waterloo County.
Editor, C. A. Zavitz, B. S. A., O. A. College, Guelph.
Auditors—J. A. Craig, B. S. A., Toronto; H. H. Dean, O. A. College, Guelph.

District Secretaries.

District No. 1, comprising Stormont, Dundas, Russell, Glengary, Prescott, Cornwall, Carelton and Grenville, W. E. Serson, Antrim.

District No. 2, Lanark, Renfrew, Leeds, Frontenac, Lennox, Addington, Hastings and Prince Edward, T. Raynor, Rosehall.

District No. 3, Nipissing, Parry Sound, Muskoka, Haliburton, Peterborough, Northumberland, Durham, Victoria and Ontario, G. B. Brodie, Bethesda.

District No. 4, Simcoe, York, Peel, Dufferin, Grey, Wellington and Halton, H. B. Jeffs, Bondhead.

District No. 5, Wentworth, Lincoln, Welland and Haldimand, H. L. Hutt, South End.

District No. 6, Waterloo, Oxford, Brant and Norfok, A. Shantz, Waterloo.

District No. 7, Huron, Perth and Bruce, N. Monteith, Fairview.

District No. 8, Middlesex and Elgin, W. A. McCallum, Ailsa Craig.

District No. 9, Essex and Kent, N. J. Clinton, Windsor.

District No. 10, Lambton, A. E. Wark, Wanstead.

Committee on Experiments.

Agricultural—Profs. James, Shaw and Robertson, Messrs. C. A. Zavitz, J. Harcourt E. A. Rennie, N. Monteith, W. A. McCallum, and H. L. Hutt.

Horticulture—Prof. Panton, N. J. Clinton and E. Lick.

Agriculture—R. F. Holtermann and A. E. Rennie.

Dairying—Prof. Robertson, G. Harcourt and A. E. Rennie.

Live Stock—A. E. Wark, F. G. Sleightholm, J. J. Sinclair, H. H. Dean and Geo. Harcourt.

AGRICULTURAL EXPERIMENTS.

Mr. C. A. Zavitz, Secretary, submitted the following report of the Committee on Agricultural Experiments:—

During the past four years a Committee has been appointed annually by the Ontario Agricultural and Experimental Union for the purpose of making proper arrangements for the conducting of Agricultural Experiments over Ontario. This work has been very

carefully done each year by the committee appointed and only those experiments chosen which were considered to be of real practical value to those conducting them, and at the same time to be of such a nature that the results would, when collected together, and printed in the annual report of the Union, afford much useful information. The tests so far have been with grains, fertilizers and corn, and during the past season there has been four distinct experiments conducted over the Province. The carrying on of this work is not now confined to the ex-students of the college alone, but a number of other leading farmers over Ontario have also joined the ranks, and both the number of experiments and of experimenters is increasing annually. Much interest and enthusiasm is manifested in these experiments, and we think a valuable work is being done.

After the names and addresses of those members of the Union and others who were desirous of conducting one or more of the proposed experiments were obtained, materia was sent in sufficient quantities to carry on the tests free of charge to the experimenters. Sheets containing full instructions regarding the detail management of the plots, and blank forms to be filled out and returned to the secretarie at the end of the season, were sent at the same time as the material for the tests. The following is a concise report of the experimental work done the past season.

Two Sets of Plots were fertilised in 1887, and hence this season's crop shows the influence of the fertilisers over third year's growth.

THIRD CROP AFTER APPLICATION OF FERTILISERS.

Fertilisers.	Ontario Experimental Farm, Wellington County.			J. B. Muir, Bruce County.			Average of two lists.	
	Oats.			Barley.			Oats and Barley.	
	Date of maturing.	Yield of straw per acre.	Yield of grain per acre.	Date of maturing.	Yield of straw per acre.	Yield of grain per acre.	Yield of straw per acre.	Yield of grain per acre.
		tons.	bus.		tons.	bus.	tons.	bus.
Salt, 10 lb. per plot (400 lb. per acre)	Aug. 11	.86	66.8	Aug. 10	.54	9.2	.70	38.0
Superphosphate, 10 lb. per plot (400 lb. per acre)	13	.76	89.6	14	.68	8.3	.72	49.0
Ground Apatite, 10 lb. per plot (400 lb. per acre)	11	.79	82.6	14	.71	8.8	.75	45.7
Farmyard manure, 700 lb. per plot (14 tons per acre)	15	.99	118.42	14	.84	12.9	.92	65.7
No Manure	14	.92	87.3	14	.68	8.3	.80	47.8

		Fertiliser.	Date of maturity, 1888.	Date of maturity, 1889.	Straw per acre (tons) estimated from 1-40 acre plots. 1888.	Straw per acre (tons) estimated from 1-40 acre plots. 1889.	Straw per acre (tons) estimated from 1-40 acre plots. Av.	Grain per acre, bush. estimated from 1-40 ac. plots. 1888.	Grain per acre, bush. estimated from 1-40 ac. plots. 1889.	Grain per acre, bush. estimated from 1-40 ac. plots. Av.	Nature of Soil.	Previous cropping.	Name of Experimenter.	County.
Black Tartarian Oats.	1	Salt, 400 lb. p. ac.		Aug. 15	Undeterm'd	2.02			51.8					
	2	Superphosphate, 400 lb. p. ac.		" 15		1.71			60.6					
	3	Ground apatite, 400 "		" 15		1.80			58.8					
	4	Freshwood ashes, 400 "		" 15		1.76			61.8				Elmer Lick.	Ontario.
	5	Farm-y'd manure, 14 tons p. a.		" 15		1.51			52.6					
	6	No manure		" 15		1.60			50.6					
Black Tartarian Oats.	1	Salt, 400 lb. p. ac.	Aug. 10	Aug. last w'k	Undeterm'd	Undeterm'd		18.8	44.7	31.8				
	2	Superphosphate, 400 lb. p. ac.	" 10	"				16.3	35.9	26.1				
	3	Ground apatite, 400' "	" 10	"				12.3	35.6	24.0				
	4	Freshwood ashes, 400 "	" 10	"				14.0	35.2	24.6			Luke Gibbons	Ontario
	5	Farm-y'd manure, 14 tons p.a.	" 10	"				17.5	42.4	30.0				
	6	No manure,	" 10	"				15.3	36.5	25.9				
Black Tartarian Oats.	1	Salt, 400 lb. per acre		Aug. 15		1.16			30.6					
	2	Superphosphate, 400 lb. p. ac.		" 15		1.20			23.5					
	3	Ground apatite, 400 "		" 15		.98			20.0				Lewis P.	
	4	Freshwood ashes, 400 "		" 15		.94			21.2				Hubbs.	Pr. Edward.
	5	Farm-y'd manure, 14 tons p.a.		" 15		1.22			35.3		Low lying.			
	6	No manure		" 15		.96			21.8					
Barley 6-rowed.	1	Salt, 400 lb. per acre	Aug. 13	July 26	.99	.50	.75	28.80	16.7	22.8		1884, fallow.		
	2	Superphosphate, 400 lb. p. ac.	" 13	" 26	.74	.45	.60	22.86	15.0	18.9		1885, fall wheat		
	3	Ground apatite, 400 "	" 13	" 27	1.04	.40	.72	26.66	13.3	20.0	Heavy clay,	1886, clover and timothy.		
	4	Freshwood ashes, 400 "	" 13	" 27	.69	.25	.47	19.83	8.3	14.1	naturally	1887, timothy.	R. E. King.	Haldimand.
	5	Farm-y'd manure, 14 tons p. a.	" 13	" 26	1.15	.40	.78	31.11	13.3	22.2	well drained.	1888, experimented with oats.		
	6	No manure	" 13	" 27	.95	.25	.60	22.44	8.3	15.4				
Fall Wheat Democrat.	1	Salt, 400 lb. per acre	Aug. 13	Aug. 1	.52	.40	.46	18.66	12.0	15.3		1884, hay.		
	2	Superphosphate, 400 lb. p. ac.	" 13	" 1	.56	.46	.51	16.00	13.3	14.7		1885, hay.		
	3	Ground apatite, 400 "	" 13	" 1	.56	.44	.50	16.66	12.7	14.7	Heavy clay	1886, hay manured.	Martin	
	4	Freshwood ashes, 400 "	" 13	" 1	.44	.54	.49	14.00	15.3	14.7	loam.		Bellerby.	Grey.
	5	Farm-y'd manure, 14 tons p.a.	" 13	" 1	.42	.60	.51	14.00	16.7	15.4		1887, timothy seed.		
	6	No manure	" 13	" 1	.56	.50	.53	15.00	14.7	14.9				

1887.—Results of 27 Sets of Experiments showing the influence of the fertilisers immediately after application. The fertilisers were applied at same time as seeding was done and harrowed in lightly.

Number of sets of experiments with each kind of grain.	Salt.		Superphosphate.		Apatite.		Farmyard manure.		No manure.	
	Straw per acre.	Grain per acre	Straw per acre.	Grain per acre.	Straw per acre.	Grain per acre.	Straw per acre.	Grain per acre.	Straw per acre.	Grain per acre.
	lb.	lb.	lb.	lb.	lb.	lb.	lb.	lb.	lb.	lb.
Oats, 13 experiments	2844	1441	2806	1474	2716	1448	2612	1480	2502	1396
Wheat, 6 "	2250	900	2194	1020	2290	1007	2605	1116	2020	820
Barley, 8 "	2291	1432	2292	1295	2180	1239	2318	1399	2200	1240
Average	2570.8	1348.4	2540.4	1408.8	2480.8	1271.6	2525.6	1384.8	2321.2	1252.8

1888.—Results of 40 Sets of Experiments also showing action of fertilisers the first year.

Number of sets of experiments with each set of grain.	Salt.		Superphosphate.		Ground Apatite.		Fresh wood ashes.		Farmyard manure.		No manure.	
	Straw per acre.	Grain per acre.	Straw per acre.	Grain per acre.	Straw per acre.	Grain per acre.	Straw per acre.	Grain per acre.	Straw per acre.	Grain per acre.	Straw per acre.	Grain per acre.
	lb.	lb.	lb.	lb.	lb.	lb.	lb.	lb.	lb.	lb.	lb.	lb.
Egyptian oats, 10 experiments.	2557	1427	2481	1487	2410	1428	2300	1298	2706	1576	2480	1294
White Cluster oats, 13 experiments	2064	1168	1979	1204	1711	1013	1912	1076	1946	1119	1806	983
Common 6-rowed barley, 12 experiments	2394	1758	2377	1769	2220	1656	2221	1588	2406	1698	2087	1512
Red Fife wheat, 5 experiments.	1371	916	1565	992	1495	868	1580	952	1755	1108	1580	896
Average of 40 experiments	2221	1393.2	2189	1432.0	2032	1307.6	2073	1274.4	2272	1412.8	2053	1221.6

1889.—Results of 5 Sets of Experiments showing action of fertilisers the second year after they were applied.

Number of sets of experiments with each set of grain.	Salt.		Superphosphate.		Ground Apatite.		Fresh wood ashes.		Farmyard manure.		No manure.	
	Straw per acre.	Grain per acre.	Straw per acre.	Grain per acre.	Straw per acre.	Grain per acre.	Straw per acre.	Grain per acre.	Straw per acre.	Grain per acre.	Straw per acre.	Grain per acre.
	lb.	lb.	lb.	lb.	lb.	lb.	lb.	lb.	lb.	lb.	lb.	lb.
Black Tartarian oats, 3 experiments.	3180	1440	2910	1360	2780	1397	2700	1340	2725	1477	2560	1226
Common 6-rowed barley, 1 " .	1000	800	900	720	800	640	500	400	800	640	500	400
Democrat Fall wheat, 1 " .	800	720	920	800	880	760	108	920	1200	1000	1000	880
Average of 5 experiments	2040	1168	1910	1120	1810	1058	1745	1068	1863	1214	1655	992

The following table shows the concise results of three years' tests with salt, superphosphate, ground apatite, fresh wood ashes, farmyard manure, and no manure, and includes oats, barley and wheat crops. There are for 1887, 27 tests; 1888, 40 tests; 1889, 5 tests; making in all 72.

Fertilisers.	1887.		1888.		1889.		Average of all crops for three years, being 72 experiments.	
	Straw per acre.	Grain per acre.	Straw per acre.	Grain per acre.	Straw per acre.	Grain per acre.	Straw per acre.	Grain per acre.
	lb.	lb.	lb.	lb.	lb.	lb.	lb.	lb.
Salt, 10 lb. per plot (400 lb. per acre)	2570.8	1348.4	2221.0	1393.2	2040	1168	2340	1361
Superphosphate, 10 lb. per plot (400 lb. per acre)	2540.4	1408.8	2189.0	1432.0	1910	1120	2361	1402
Ground apatite, 10 lb. per plot (400 lb. per acre)	2480.8	1271.6	2032.0	1307.6	1810	1058	2185	1277
Fresh wood ashes, 10 lb. per plot (400 lb. per acre).....	.....	.....	2073.0	1274.4	1745	1068	2036	1251
Farmyard manure, 700 lb. per plot (14 tons per acre)....	2525.6	1384.8	2272.0	1412.8	1863	1214	2339	1388
No manure	2321.2	1252.8	2053.0	1221.6	1655	992	2126	1217

In all grain and fertiliser experiments the plots were one-fourth of an acre, and the results were reckoned out per acre from the size of plots.

The superphosphate used in these tests was obtained from Smith's Falls and cost $26 per ton, and the ground apatite or phosphate was procured at the same place at $12 per ton.

The analyses of these fertilisers were as follows :

	I. Apatite.	II. Superphosphate.
Water	0.16 per cent.	5.885 per cent.
Soluble phosphoric acid	.... "	10.489 "
Reverted " "	.... "	6.808 "
Insoluble " "	27.848 "	1.313 "
	27.848 per cent.	17.615 per cent.

The analyses of salt showed the following :

Sodium chloride, pure salt	89.42 per cent.
Calcium sulphate—gypsum	1.45 "
Calcium chloride	0.11 "
Magnesium chloride	2.01 "
Insoluble matter	0.18 "
Water	6.75 "
	99.92 per cent.

An analyses of an average sample of fresh wood ashes gave the following :

Water	2.07 per cent.
Insoluble matter	7.68 "
Potash	7.15 "
Phosphoric acid	1.89 "
Lime	37.33 "
Magnesia	3.02 "
Iron and alumina	1.53 "
	60.67 per cent.

EXPERIMENT No. II.

(1) Select a piece of ground of same nature throughout, under same conditions and representative as far as possible of the land of the neighborhood. Avoid naturally wet spots, and keep clear of trees, fences and buildings. Give cultivation to experimental plots similar to that of your larger fields. An advantage would be gained if the plots could be chosen in such a position that they could remain for experiments another year.

(2) Mark off four plots of one-fortieth of an acre each, leaving a clean path two feet wide between the plots. Two rods square is a convenient shape.

(3) Submit all plots to same treatment, and sow one-fourth of grain sent on each. Aim at seeding one inch deep.

(4) Apply the superphosphate sent to plot No. I ; the dried blood and scrap sent to No. II ; farmyard manure to No. III, and leave No. IV without any manure. The fertilisers to be sown at the time of seeding.

(5) Keep plots at all times clear from trespassing by poultry, etc.

(6) Aim at sowing 700 lb. farmyard manure on No. III plot (14 tons per acre).

(7) If it is your wish to carry on this experiment, please inform the Secretary, naming your nearest express office, and there will be sent to you, expressage prepaid, 7½ lb. oats ; 10 lb. superphosphate for plot No. I, and 10 lb. of dried blood and scrap for plot No. II.

Results of Experiment No. 2.

No. of Experiment.	Variety of grain.	No. of plot.	Fertiliser.	Date of Maturing.	Straw per acre.	Grain per acre.	Remarks.	Previous cropping.	Nature of soil.	Name of Experimenter.	County.
					tons	bus.					
I.	Egyptian oats.	1	Superphosphate	Aug. 26	1.09	45.9	Oats from no manure plot had less weight per bushel than each of the other three by two lb.	1886, sod. 1887, peas. 1888, wheat.	Clay loam.	Enos Walker.	Muskoka.
		2	Dried blood and scrap...	26	1.07	45.3					
		3	Farmyard manure	30	1.16	49.4					
		4	No manure.....	31	.77	37.1					
II.	Egyptian oats.	1	Superphosphate	Aug. 15	1.53	46.5	The plumpest grain was from No. 3 plot.	1886, 1887 and 1888, oats.	Medium loam.	C. D. Bowman.	Waterloo.
		2	Dried blood and scrap...	" 15	1.50	35.2					
		3	Farmyard manure	" 15	1.94	48.2					
		4	No manure.....	" 15	1.40	35.3					
III.	Egyptian oats.	1	Superphosphate	Aug. 24	1.10	23.5	Crop on no manure plot was most affected by rust and was weakest in straw. Grain from No. 2 plot plumpest of all.	Sod.	Sandy loam.	Donald McLaren.	Lanark.
		2	Dried blood and scrap...	" 26	1.20	24.4					
		3	Farmyard manure	" 22	1.14	18.8					
		4	No manure.....	" 24	1.00	17.6					
IV.	Egyptian oats.	1	Superphosphate	Sept. 7	1.42	23.5		1888, Potatoes.	Sandy loam.	William Quinn.	Muskoka.
		2	Dried blood and scrap...	" 7	1.56	27.1					
		3	Farmyard manure	" 7	1.31	27.1					
		4	No manure.....	" 7	1.56	25.9					
V.	Black Tartarian oats.	1	Superphosphate	Aug. 24	1.00	41.2	No. 2 plot withstood the dry weather best. Grain from No. 2 plot plumpest, and straw from No. 2 plot heaviest and brightest of all the plots.	1888, Peas. No manure for twelve years.	Sandy loam.	H. N. Alexander.	Middlesex.
		2	Dried blood and scrap...	" 20	1.24	44.7					
		3	Farmyard manure ...	" 20	1.08	42.3					
		4	No manure.....	" 30	.78	34.7					
VI.	Egyptian oats.	1	Superphosphate	Aug. 28	1.58	36.5	Grain from No. 1 plot was two lb. heavier and that of No. 4 plot two lb. lighter than that from the other plots.	1887, sod. 1888, peas.	Clay loam.	George Binnie.	Grey.
		2	Dried blood and scrap...	" 28	1.48	40.0					
		3	Farmyard manure	" 28	2.41	55.6					
		4	No manure..... . ..	" 28	1.15	32.5					
VII.	Egyptian oats.	1	Superphosphate	Aug. 11	2.02	66.8	The crops on No. 2 and 3 plots were lodged more than those on Nos. 1 and 4.	1886, fallow. 1887, spring wheat. 1888, oats.	Clay loam.	Ont. Expt. Farm.	Wellington.
		2	Dried blood and scrap...	" 12	2.33	69.1					
		3	Farmyard manure	" 15	2.46	66.5					
		4	No manure.....	" 13	1.91	60.0					

The average results of this Experiment were as follows :—

Fertiliser.	Straw, per acre.	Grain, per acre.	Fertiliser.	Straw, per acre.	Grain, per acre.
	Tons.	Bush.		Tons.	Bush.
Superphosphate..... 400 lb. per acre.	1.39	40.55	Farmyard manure..... 14 tons per acre.	1.64	43.99
Dried blood and scraps... 400 lb. per acre.	1.48	40.82	No manure.....	1.22	34.73

EXPERIMENT No. III.

(1) Select a piece of ground of same nature throughout, under same conditions, and representative as far as possible of the land of the neighborhood. Avoid naturally wet spots, and keep clear of trees, fences and buildings. Prepare the ground as you would a large field for the same crop.

(2) Mark out four plots of one-tenth of an acre each, allowing a clean path between the plots. Four rods square is a convenient shape for each plot.

(3) Sow the same kind of corn (M. S. S. Corn) on each plot as follows :—

No. I plot—Drills of equal distance apart (as near 3½ feet as possible) with seed averaging two grains to the foot.

No. II plot—Drills of same distance apart as No. I, with seed averaging twelve grains to the foot.

No. III plot—Broadcast or close drills with seed averaging one-half bushel per acre (2.8 lb. per plot).

No. IV plot—Same as No. III with seed averaging three bushels per acre (16.8 lb. per plot).

(4) Aim at having the seeding all done in one day, and not later than 15th day of June. NOTE—Shallow planting for early seeding, and deeper planting if late enough for soil to be warm.

(5) Give plots I and II the same amount of after cultivation, as often as you think they need it, but avoid mounding the rows ; shallow cultivation is preferred.

(6) Purchase 40 lb. of M. S. S. Corn from your seedsman and send the account to the Secretary, C. A. Zavitz, as early as possible, and the money will be sent you until the limited funds of the Committee are exhausted. This will save much unnecessary expense of expressage. If you cannot obtain the corn apply to the Secretary, mentioning your express office, and it will be forwarded to you.

(7) Cut each crop at the time when its condition corresponds to the roasting condition of field corn, or when in the glazed state.

(8) Weigh produce from the plots when under as equal conditions as possible. NOTE—If you can observe the comparative results from the feeding of the different lots please send information under head of "Remarks" in blank form.

(9) Fill out the accompaning blank form and return.

The following is the average for the three experiments in fodder corn :—

	Seed and cultivation.	Percentage of stalks having ears.	Yield per acre. (Estimated from plots 1-10 acre.)
			Tons.
1	Drills (2 grains per foot)	51.7	8.8
2	Drills (12 grains per foot)	1.7	10.0
3	Broadcast or close drills (½ bus. per acre)	13.7	7.41
4	Broadcast or close drills (3 bus. per acre)		9.8

Results of three experiments in growing fodder corn.

	No. of plot.	Seeding and cultivation of crops.	When sown.	Distance apart of rows.	Average depth of planting.	Dates of cultivating and hoeing.	No. of stalks grown per 100 feet.	Depth of cultivating.	Weight of produce.	Percentage of stalks having ears.	Nature of soil.	Previous cropping.	Name of Experimenter.	County.
							About		lb.	About				
I	1	Drills—2 grains per foot.....	May 24.	40 inch.	1 inch..	After each rain.....	100	2 inch	766	100	Sandy loam.	Sod pasture.	E. M. Zavitz.	Middlesex.
	2	Drills—12 grains per foot.....	" 24.	40 "	1 " ..	" "	400	2 "	1,112	5				
	3	Broadcast or close drill—2.8 lb. per plot (½ bus. per acre).	" 24.	8 "	1 " ..	.....	100	None.	1,240	..				
	4	Broadcast or close drill—16.8 lb. per plot (3 bush per acre).	" 24.	8 "	1 " .	.....	500	None.	1,000	.....				

REMARKS.—Some of the stalks in No. 1 had two ears on. A number in plot 3 had nibbins, but no full ears.
CONCLUSIONS.—On light soil I believe in planting thin as it stands up better and is more easily harvested in drills, about four feet apart. I believe what is minus n quantity will be more than made up in quality.

	1	Drills—2 grains per foot.....	June 12	30 inch.	About 3 inch.	Harrowed June 22; cultivated July 6; drills hoed July 9; cultivated July 19.	110	3 inch	2,160	50	Clay loam.	Oats, peas, sod.	Geo. Binnie.	Grey.
II	2	Drills—12 grains per foot.....	" 12	30 "	3 "	Similar to No 1	650	3 "	2,450	None.				
	3	Broadcast or close drill—2.8 lb. per plot (½ bus. per acre).	" 12	.....	.....	... .	.....	.....	1,005	30				
	4	Broadcast or close drill—16.8 lb. per plot (3 bus. per acre).	" 12	.....	.....	.....	.....	.....	2,180	alm'st none.				

REMARKS.—Owing to the cold, wet spring, much of the seed did not grow.

	1	Drills—2 grains per foot.....	May 18.	42 inch.	1 inch..	Horse cultivating July 2-23; hand hoeings July 16, Aug. 15.....	97.9	2 inch	2,344	5	Clay loam.	1884 roots, 1885 barley, 1886 clover, 1887 oats, 1888 green fodder.	O.A.C. Experimental Department.	Wellington.
III	2	Drills—12 grains per foot.....	" 18.	42 "	1 " ..	Same as No. 1	592.5	2 "	2,413	.....				
	3	Broadcast or close drill—2.8 lb. per plot (½ bus. per acre).	" 18.	.....	1 " ..	.....	.....	None.	2,201	11				
	4	Broadcast or close drill—16.8 lb. per plot (3 bus. per acre)	" 18.	.....	1 " ..	.....	...	"	2,677	.....				

REEARKS.—At the time of cutting many of the leaves of No. IV plot had turned yellow, while on Nos. I and III the leaves were green and thrifty looking.
CONCLUSION.—Owing to only about one-half of the seed germinating, this experiment is considerably modified thereby.

EXPERIMENT No. IV.

From the Southern States, where Kaffir corn is extensively grown, we obtain the following information: It stands dry weather well. Where corn will suffer from drouth, this plant will simply stop and wait for rain, and then go on and make its full yield. In the way of dry fodder it makes enormous returns. It will grow on any land suitable for corn, and even on land too poor for that crop. Its seed weighs 50 lbs. to the bushel.

This one—Kaffir corn—is the earliest of the five varieties of non-saccharine sorghums. It grows from four to five feet high, making a straight, upright growth, having a stocky stem with numerous wide leaves. The stalks keep green and are brittle and juicy, not hardening like other samples of sorghum, making excellent fodder, either green or dried, which is highly relished by cattle and horses. The seed heads form at the top of each stalk, and as soon as these show the grain well the joints next below the top send up shoots which yield the second seed heads. If the crop is wanted mainly for fodder it is recommended to cut down the whole stock when the first seed heads come into bloom, at which stage it cures admirably and makes most excellent forage.

The pound of seed sent to you is sufficient to plant one-quarter of an acre of ground. The first week in June is recommended as the best time for planting. The land need not be very rich, but should receive similar cultivation to that for an ordinary corn crop. The rows should be three feet apart, with from 3 to 4 seeds per foot. The cultivatings or hoeings between the rows should be the same as for common corn. The proper time to cut the fodder is when the first seed heads come into bloom.

The Kaffir corn was recently received from S. Carolina for the Dairy Department. A portion has been handed over to the Experimental Union for distribution. We think this valuable fodder plant may do well in your section, and that it would be to your interest to give it a trial.

The Kaffir corn has not proved a very marked success in our climate, the average results of six experiments being as follows: Weight per plot 1,665.5 lb., or 16,655 lb. per acre, being 8.3 tons of the green fodder.

CORN AND HOGS AS SOURCE OF PROFIT IN FARMING.

BY BYRON ROBINSON OF WHEATLEY, ONT.

The territory in Ontario, with the climate suited for the growing of corn, is very limited, but the crop can be grown in almost every part of the province for fodder for soiling purposes during summer and autumn, or for storing in the silo, or lastly for drying for winter use. But in Essex corn is one of our best grain crops. We prepare our ground about the second week in May. After having the ground plowed in the fall, we cultivate and harrow well in the spring and then mark out in rows four feet apart both ways, plant with a hand-planter, and in about two weeks the corn will be up and ready for the horse-hoe and will need about the same culture as any other hoe crop. When ripe, which will be inside of one hundred days after planting, cut, put in shocks with from eight to ten hills square in a shock. A good average crop of corn will yield one hundred bushels of ears per acre, and the fodder will be as good as a light crop of hay, and will pay rent and taxes on the land. The cost of growing an acre of corn after using the fodder as above mentioned. will be as follows:

Plowing ground	$ 2 00
Cultivating and harrowing	60
Marking	20
Planting	20
Horse-hoeing, three times both ways	4 50
Cutting	1 00
Husking	4 00
Cribbing	50
Total	$13 00

At this rate the corn would cost exactly 13 cents per bushel of ears. We find by experiment that it takes twenty bushels of corn in the ear to make one hundred lb. weight of pork, which, after allowing the manure for attending the pigs, will cost $2.60 per hun-

dred, and we are safe in counting $5 per hundred dressed pork. This leaves a profit of $2.40 per hundred, or $12.00 profit on growing one acre of corn and feeding the produce to hogs.

Farmers in the corn belt, owning from twenty-five to fifty acres of land can make greater profits in raising hogs than can be made with any other stock, as they require less grass land.

The grain would be fed to the hogs, and the fodder when saved will suffice to winter the necessary cows.

If what is taken from the land be returned in the shape of manure, corn can be grown on the same ground for any number of years without any fear of impoverishing the soil. Corn has been grown for twenty years in succession on the same land with us without manure, the last crop being as good as the first. But farmers in possession of larger tracts with considerable quantities of natural grass-lands, can do better by feeding corn to cattle on pasture. Our conclusions have not been arrived at by theory, but by practice.

The breeding and management of swine constitutes one of the most important branches of agriculture in the south-western parts of Ontario, and none but the best breeds should be allowed on the farms. A single pair of any of the improved breeds would increase in three years sufficient to stock the largest farm. The boar could also be used to forty or sixty other sows. After making up your mind to any one particular breed, grade or cross, stick to it and you will be sure to succeed better than by mixing, and in any case do not breed the same sow to two boars of different breeds. After the breed is secured, then there should be the best of feeding and care daily from the time they are born until they are slaughtered, or sold at live weight as the case may be. As a rule a sow should not be allowed to farrow under the age of fifteen months, and the boar is not fit for continued service until he is eighteen months old. A sow will breed three litters a year, but in our opinion two is plenty ; one in spring and the other in the fall. And in fact, some of our best breeders are advising but one litter a year, and that to be dropped in the spring, as they may be fed in the summer with mostly green fodder and pasture, only giving grain at night, When a sow is to farrow in cold weather, provide a good warm pen, but allow her and the little pigs to have free access to fresh earth daily. We have lost pigs by keeping them confined too close, but never lost one when the above method was carried out. When the weather is warm let the sow shift for herself. After a sow has farrowed give her warm drink for three days, and feed sparingly on soft food and under no circumstances feed as to make the young pigs unduly fat. When they are from three to four weeks old, geld, and in about sixteen days they will be old enough to wean. The period for feeding pigs, being from weaning to selling time, should have the greatest of care. The market no longer requires the hog of four hundred lb., and experiments show that it takes five per cent. more food to make one pound of growth on one hundred and fifty lb. pig than it does on a fifty lb. one. It is therefore evident that the greater profit will be realised by pushing the young pigs along as fast as possible. Our method for feeding in summer is to let the hogs run in yards that have been sown with clover or with grass. We feed all the grain food we can, such as clover, oats, peas, pig-weeds and sweet corn. When the pigs are first weaned skimmed or butter-milk is excellent food, but when that cannot be obtained a little linseed or oat-meal and shorts mixed with kitchen swill will answer, later on give as much mixed grain, shorts, bran, etc., as they will eat, and we always finish with corn, as pork finished on corn always brings the highest price. In winter, follow as near as possible the above rule as regards feeding, try and replace green fodder with something else such as roots. In all cases give plenty of fresh water no matter how sloppy the food may be. Give a little sulphur occasionally, and plenty charcoal ashes, salt and fresh earth. Keep pens and especially bed, clean and dry. We would advise selling by live weight, as the day is not far distant when no hog will be slaughtered on the farm, and sold by dress weight, and the sooner that day comes the better for both the hog raiser and the packer.

Mr. BRODIE—Would you advise selling pork by live weight or dressed?

Mr. ROBINSON—I would advise to feed during summer and sell live weight in the fall.

Mr. SHORE.—Do you harrow corn in your section?

Mr. ROBINSON—Yes, I have practiced this a good deal, and can recommend the system very highly, but the corn should not be harrowed when more than 1½ inches high. I would advise having hills four feet each way. This is for raising the grain that I am speaking.

Mr. SHORE—How can you get enough manure with hogs?

Mr. ROBINSON—We do not need much manure in Kent.

Mr. ——— How many grains do you put in each hill?

Mr. ROBINSON—We like four stalks, but put six grains in the hills. Iadvise planting in a double hill.

Mr. SINCLAIR—Instead of leaving the female until twelve months and the male until fifteenth months, I would prefer using the sows at eight months and the boars at twelve months of age.

Mr. ROBINSON—I believe the sows should mature before breeding. I am of the opinion that a cross from a Berkshire boar and Yorkshire sow would make a fine animal.

Mr. HOBSON—Why is the Yorkshire white preferred by the shippers?

Mr. CLARK—The demands of the hog market have varied very much during the past few years. Formerly, a very fat hog was required, but what is called for now is a pig weighing from 150 to 180 or 200 lb., with the pork well streaked. I think the main reason for recommending the Yorkshire is because at that age they produce the desired kind of pork, and spring litters will produce the required material in the fall.

Mr. SINCLAIR—I also think it is the superior side meat of the Yorkshire that is desired—the meat being streaked and the side long. I would advise crossing a Yorkshire sire and a Berkshire sow and the desired hog will be produced, and you will get an early matured pig.

Mr. CLARK—Another advantage of Yorkshires is the fact that they are white.

Mr. SHORE—Farmers in England grow hogs very rapidly and sell before getting very fat, and I think we should not grow ours too fat.

Mr. HARCOURT—I notice in the Wisconsin report that there is a great deal of stress put on the way of feeding to produce pork of the right quality.

Captain HOOD—I very strongly advocate crossing a Berkshire boar with a Yorkshire sow.

THE FARMER'S SON BEFORE AND AFTER A COURSE AT COLLEGE.

By J. B. MUIR, NORTH BRUCE.

The title of my essay is one in which the most of us have a personal interest, as the great majority of those present are farmers's sons with or without the advantage of a two year's course at the O. A. C.

But that use of the term, farmer's son, is too comprehensive for our purpose, and we must limit it to the particular sons who are making agriculture their professsion. If we acquaint ourselves with the early history and training of the average farmer's son of to-day, we shall generally find a moral, careful, and hard-working young man. One who in common with his parents is striving to the best of his ability to raise remunerative crops and earn an honest living.

To do this he has for his principal guides past experience and observation, interspersed with hints from agricultural papers and journals. These, when properly mixed with good common sense, are no mean guides, and in the past have carried many of our farmers in safety to comparative ease and plenty. But in this age of competition, ex-

hausted soils and uncertain seasons, the guides mentioned are often insufficient and we find many farmers young as well as old, straying gradually and surely into bankruptcy. Sometimes this is the result of bad management; at others it is produced by unforseen circumstances; but more frequently it is due to ignorance pure and simple, as to the nature and treatment of the soil, stock, and crops with which we have to deal.

Hence we find that the intelligent thinking class amongst the farmers are availing themselves of every opportunity for increasing their knowledge, both theoretically and practically, in agricultural lines. In like manner, also, the sons of quite a number of the better class of farmers are taking the two year course at the Ontario Agricultural College to prepare themselves for meeting the difficulties incident to farm life. In all this, experience is teaching us that in order to be successful we must have more knowledge, more of other men's ideas stored up within us ready for us when required. To be an intelligent man, or a graduate of the Ontario Agricultural College, does not necessarily make us successful. It is only when the knowledge we possess is rightly applied and persevered in that success will crown our efforts.

We have already stated that knowledge is not success; it is rather that by which the road to success is made easy. The farmer's son, before taking the Ontario Agricultural College course of study, finds the road uneven and hard to follow; but after taking the full course, he finds it graded and carefully marked out. He has now for his guides the experience and practice of the ablest men in his profession, while the leading truths and principles in agricultural science are at his disposal. He has, as it were, a part of nature's laws revealed to him; while his duty to nature has been more clearly defined. Instead of following on blindly in the practice of his ancestors, he is able to press forward intelligently into the front ranks and make agriculture a success.

Instead of being a slave and a drudge in his profession he rises above this, and takes his chief pleasure and delight in subduing nature and her difficulties, under his control. Instead of grinding out every trace of natural fertility in the soil, his aim is to keep it constantly renewed and increasing from year to year. Instead of simply keeping and half starving the poorest class of stock he strives to keep the most and best of any in the neighborhood. Instead of sending off the best of the manure to grow sea-weed in the Atlantic Ocean, it is carefully saved at home and set at growing corn and other cereals.

These are a few of the distinguishing features between the farmer's son before and after a two year course at the O.A.C. But these are not all, we find a great improvement in the social position of the farmer's son after graduating successfully. His is now a position of honour in the farmers' councils, institutes, agricultural societies and the like, and even in church and state affairs his influence is greatly advanced. His mode of farming is carefully watched and if successful copied more or less by his neighbors. His advice is also frequently asked for, and in this way he finds his sphere of usefulness greatly increased.

But there is yet another aspect of this question, of even greater importance than any we have yet mentioned. The course of training prescribed and followed at the O.A.C. is one especially fitted for developing the mind. It embraces many subjects, and ranges through so many fields in nature, that an appetite for knowledge must be stimulated in the minds of the most indifferent. To satisfy this there is a great variety of choice literature over which the cultivated mind delights to roam. This desire to read and improve the mind is one of the few pleasures of which we never grow weary, and one in which the Ontario Agricultural College graduate has the advantage. The life of the average farmer's son is one of physical labor in which there is little time to cultivate a taste for reading or other intellectual improvement. His education, though it may be the best the public school can supply, is not not broad enough, nor advanced enough, to stimulate a desire for knowledge, especially agricultural knowledge, of which he stands most in need. Much of his early training is lost from not being able to connect the ideas conveyed in the lessons with future usefulness. The foundation of his early training is not broad enough to enable him to understand even the simplest works on agricultural science, which all require more or less knowledge in chemistry. This branch of science, so mysterious and yet so simple, is the key to agricultural knowledge, and the average farmer's son is almost ignorant of its existence.

The science course at the Ontario Agricultural College opens up an entirely new field to the student of nature, and an intelligent farmer must study her closely, both for pleasure and profit, to be successful. Consequently, the Ontario Agricultural College graduates have a great advantage in this respect over those whose education is limited to a public school. But it may be maintained by some that a careful course of reading would supply all the pleasures obtainable from having an educated mind. But this is not the case, we must come in contact with well trained men that the truths read may be impressed and retained, and no amount of reading will compensate for a deficiency of practical proof and experience. Truths read and lessons taught are fully appreciated only when taught and explained by practical men.

But the question which interests us as graduates and ex-students is not, what are the advantages of the Ontario Agricultural College course of study, but are we rightly employing and improving the advantages we feel we have gained by our two years of practical study? Are we doing what we should to build up and maintain the reputation of our college, that others may be induced to go there and be benefited? Are we, as individuals, striving to do the best for ourselves and our country according to the instruction given us? Our position is evidently in the front ranks, leading the agricultural thought and practice of our fair Province; let us, therefore, be alive to the position we hold, and show, by practical proof, that we and our college are able and fitted to lead ourselves, and farmers generally, to success, in this age of agricultural depression. Much good work has been already done, but there is yet a great deal of progressive, intellectual labor required before the science of agriculture is understood by the vast majority of those who cultivate the soil. At present they are uncertain whether the training given at the Ontario Agricultural College is practical or not; let it be the aim of each one of us to show by practical proof and experiment that it is practical, and that we are better, wiser, and more successful farmers after taking the two year course of study at the Ontario Agricultural College.

THE NEED AND USES OF EXPERIMENTAL WORK IN DAIRYING.

By Prof. James W. Robertson, Dairy Commissioner, Ottawa.

Following is a synopsis of an address by Prof. Robertson:

Improved methods of agriculture have grown out of experimental work, pursued with more or less intelligence and care since the times of Adam and his remarkable son, whose jealousy and envy at Abel's success seems to have become the possession or possessors of some of his craft, by whom every effort to do things in any other way than according to their preconceived notions, is taken as a personal rebuke and cause for dislike to this day. An increased knowledge of the laws that govern the changes in nature, which farming seeks to bring about and control, has come from crude and intermittent experiments, as well as from the well-planned, skilfully-conducted and continuously-pursued investigations, which have been made at the experiment stations so liberally devised and supported by governments on this continent during recent years. In time to come, experimental work in dairying should not be confined to the government experiment stations.

The Ontario Experimental Union may, with advantage, take up some branches of it, with the certainty of giving valuable service, enlightenment and encouragement to the farmers of the province. The need of further investigation, through experiment, has increased rather than diminished.

The purpose of all intelligent effort in farming, is the creation of wealth and the making of profits for the persons who are engaged in that occupation.

In exchange for the products of the fields and animals the farmer obtains what may be called here gross receipts. The gross receipts may include cash, goods received in trade or exchange, house-rent, board, lodging, the use of horses for pleasure and work,

etc. A large proportion of the gross receipts of most men, except farmers, must go out as expenditure for those things which the farmer gets from his products over and above the cash which he handles. A small cash income does not always mean a small income, nor does a large sum as gross receipts always indicate a large profit. The measure of profit is the difference between receipts and expenditure. All experimental work that helps to show how expenditure or cost may be reduced, without lessening the quantity or degrading the quality of the products in dairying, is legitimate work worthy of your union.

Investigation may be directed profitably by one or more members, towards the discovery of how far and in what ways expenditure or cost of production can be lessened under the following heads :—

I. *The use of feed of cheaper sorts.*—Can corn be produced at a cost of $1.75 per ton on the ordinary farm? How much of it will produce as much milk as one ton of hay? How does the cost of soiling compare with that of pasturing for milk production in different districts of the Province? Are roots as economical for a succulent food as corn or other ensilage?

II. *The mixing of feeds into the best combinations.*—Is the nutritive ratio theory sound, when acceptability of flavor is ignored?

III. *Providing and preserving fodders and grain in the most acceptable condition of flavor.*—What is the worth of a ton of hay that has been exposed in the feeding passage for a day and mussed over, compared with a ton of hay of equal quality fresh from a compact mow? Does digestibility of feed depend in any degree upon its palatability?

IV. *A reduction in the quantity of feed offered to cattle.*—When a cow eats too much rich feed, an immediate consequence is a lessened flow of milk of impoverished quality. Are many cows spoiled by over-feeding?

V. *A lessening of the cost of labor and expense in producing, manufacturing and marketing.*—Is there any advantage in carrying on dairying in winter in respect to the labor available on the farm during that season? Can butter and cheese be made as economically in small lots in private dairies as in co-operative factories? Can dairy goods for the home market be sold best direct into the consumer's homes from the producers? Will it pay the producer to sell always, when perishable goods are in the best condition, regardless of the current or prospective price?

I have used a great many interrogation points. In trying to answer the enquiries every honest investigator will learn much and to some extent become a teacher to instruct and stimulate others.

The tendency to devote one's whole attention to the receipts as the source whence may be obtained an increased profit is a common weakness of judgment, when a business calculation is being made, The reduction of expenditure or cost of production is a more controllable factor in profit-making, and still there are safe and economical ways in which receipts can be legitimately and certainly augmented. Practical enquiry may seek to learn from experimental investigation, to what extent that may be accomplished under the following heads :

I *Enlargement of the capacity of the animal.*—May not the capacity of every dairy cow be enlarged, until she gives annually as many pounds of solids in her milk as her live weight?

II. *Improvement in the quality of the product.*—How far can the quality of milk as to its per cent. of solids be varied by feed and treatment of the animal? How far does the quality and the kind of feed influence and affect the flavor of animal products. The quality of all food products not only modifies the market price, but gives stability or uncertainty to the demand in degree as it is uniformly fine or irregular and inferior.

III. *Selling most of the product at a season of the year when prices rule highest.*—Is cheese-making in summer and butter-making in winter the best dairy practice for the farmer, under ordinary conditions in Ontario?

IV. *Marketing products in the best concentrated form.*—Will the labor and expens

of special preparation, in giving products an attractive appearance for the market, add more to their value than the extra cost involved? Will such a preparation help to secure a class of customers able and willing to pay the highest current prices?

V. *Making the most of by-products.*—Animal products from the dairy retain an average of less than 20 per cent. of the total nitrogen, phosphoric acid and potash in the feed consumed. The manure which contains the residue of these from the feed is the first by-product. Although it contains over 80 per cent. of the valuable constituents of the feed, it is not worth 80 per cent. of the original value. How can it be saved and used to yield the greatest value? Skim-milk, butter-milk and whey are by-products. In what combination can they be fed with most profit to calves, colts and swine?

The common dairy practice is a reproach to the business judgment of the farmer. Many cows are fed at an annual loss. They board on men who can ill afford to support indigent cows on the out-of-door relief plan. Single cows in some herds, like the Egyptian lean kine, in everything but appearance, swallow up the profits of two cows which are exercising the profit-making talent. Thoughtful experiment in any kind of a way, along the line indicated, cannot fail to convince any farmer of the possibility of realising some profit from dairying, and may stir him up to try for more while helping him to succeed in getting it. An experimenter generally becomes enthusiastic, enthusiasm is contagious and practical investigations keep it operative in beneficial ways.

Mr. Hobson—Do you still advocate feeding twice daily?

Prof. Robertson spoke much in favor of feeding twice daily.

Mr. Robinson—We used to feed four times a day, but on hearing Prof. Robertson advocate feeding twice daily, we have adopted the plan and like it well.

Prof. Shaw—How soon should corn be put into the silo after it is cut?

Prof. Robertson—Every crop for the silo should be near maturity and allowed to wilt until it reaches about 73 per cent. water. I would cut it from one to two days before filling into silo. Sunlight upon plants after they are cut, seems to produce an aroma in the fodders which is much liked by stock, and gives a greater feeding value to the crop.

Mr. Zavitz—To what height would you recommend a silo to be built?

Prof. Robertson—I would not recommend a silo over 20 feet except in special circumstances, and never more than 25 feet.

Mr. Hobson—Would you recommend a plank floor to a silo?

Prof. Robertson—I would prefer a clay floor.

Mr. Zavitz—How did the experiment with the different walls of the silo turn out this winter?

Prof. Robertson—We have a silo built with all its sides differently constructed, which are about as follows: The studding was 2″x10″ on each side, and one wall was made by simply nailing one thickness of undressed lumber horizontally on the inside of the studding. Another was made by having the lumber tongued and grooved, and dressed on one side, and with tar paper between the lumber and the studs. The third had first inch lumber dressed on one side, then tar paper and inch lumber dressed on one side, and the other side was similar to No. 3 wall, but the lumber was tongued and grooved. The only silage that was at all spoiled was that in for about 3 or 4 inches along the side first described. I would recommend a covering of poles and straw over the silage. I will always go against painting the inside of a silo with tar, but petroleum is a good thing to preserve the wood.

BARLEY GROWING IN ONTARIO.

By Mr. T. G. Raynor, B.S.A., Rosehall.

Barley was grown as a cereal crop in very remote times. We learn from Ex. 9,31 that when Moses was pleading with Pharoah to let the Isrealites go, one of the plagues was a violent hailstorm which destroyed the barley crop then in the earing stages. In the time of our Saviour barley was used as a breadstuff, as is indicated in the narration of the miracle "The feeding of the five thousand." Of its value we find that in Rev. vi. 6, it was considered to be worth only one-third of what wheat was valued at.

Of its abuse we learn nothing until a much later date. Gambrinus, a legendary king, is regarded by the Germans as the inventor of beer. His memory is kept fresh by pictures of this supposed person, which are hung over the bars of many of the beer drinking dens, especially in Germany which is second to Great Britian in the manufacture and consumption of beer. It is estimated that the total yearly output of all the nations has now reached the enormous amount of 4,970 [illegible] gallons.

Many years ago the farmers of Ontario found it profitable to grow barley for the export trade, the great bulk of it going to the United States. The acreage devoted to this crop increased from time to time as wheat growing in many parts became unprofitable, as a result largely from injudicious cropping of wheat after wheat, wheat after wheat, and wheat for a change. Very little was returned to the soil in the shape of manure, to supplement the plant food which was being manufactured in the soil and what came from the atmosphere. So that I find, taking the bureau of industries as my authority, that for the last seven years the average number of acres sown to barley is 757,525, yielding nearly 20,000,000 bushels, or an average of 26.1 bushels per acre. Compare with the other cereal crops grown, barley stands third in the amount of acres sown, and second in the yield per acre; more land being devoted to wheat and oats, but only the latter leading in the quanity per acre.

The yearly average export of barley for the eleven years 1868-87 has been 8,210,222 bushels, valued at $5,674,014, or 69 cents per bushel. From these figures we gain some idea of the importance of the barley industry to this Province in the past; and the present outlook would indicate that its importance as an export crop was altogether a thing of the past. However, the bright side of the picture may again turn to us before we anticipate it.

From observation we learn many things, and among them, that Ontario is specially adapted for the successful development of many important industries. Her water power climate, soil, and other natural resources are all conducive to this end. Examining more closely we find that Ontario has many local conditions favoring each separate industry. To illustrate, only four or five sections are really adapted for fruit culture, other sections for stock raising and dairying, and even the cereal crops are partial to local conditions, such as soil and climatic influences. Let us apply this to barley growing. Once more referring to the bureau of industries I find the counties bordering on the Bay of Quinte, lakes Ontario and Huron, Georgian Bay, with the inland counties of Victoria and Peterborough, to be the chief barley growing sections of the Province. Examining the soils of these counties we find a great deal of heavy and gravelly clay soils, with in some instances clay loams all of which produce the best samples of barley, at the same time bear in mind the fact, that all these districts are more or less influenced by the large bodies of fresh water lying adjacent to them.

Barley is grown chiefly for two purposes, viz., *malting and feeding.* As the great bulk is grown for the "brew of the world," one object should be to grow it suitable for that purpose. What the malster desires in brief, as I understand it, is a plump, bright, heavy barley, containing a large percentage of the carbohydrates, which will malt in the quickest possible time, and uniformly. Besides manufacturing beer from the malt, much of the bright barley, by distillation, goes to make the "pale ale" and "porter," which are delicate whistle wetters for the nabobs.

Land devoted to barley growing should be prepared in the *fall*, for spring seeding. Any preparation made for a wheat crop is quite as suitable for barley, as sowing a bare fallow, after a hoed crop, on clover sod plowed in the fall, or after a pea crop, where the land has been ganged, repeatedly stirred with the harrow and cultivator, and finally plowed with a single plow, throwing the furrow well up to the action of the frost, or simply ridging it. In spring, prepare the seed bed before sowing, getting it in as fine a state of tilth as possible, being careful not to work the seed bed to a greater depth than four inches (as barley is a shallow growing crop and requires its plant food at the surface.) If the land be in good condition and dry, drill; if very moist, broadcast; in either case be careful not to cover too deeply, one inch to one and one-half inches is plenty. Sow at a time, if possible, when the seed will germinate uniformly and continue to grow vigorously. From one to two bushels is the quantity sown per acre, varying with the kind of soil. I prefer one bushel, if drilled, or one bushel and a peck where broadcasted. I am of the opinion that in many parts of the country too much seed is used per acre, except, perhaps, where farmers have to provide for injurious insects. Manures for barley should be applied as a top-dressing, or merely worked into the surface soil. Top-dressing in winter with farmyard manure where barley is to be sown gives splendid results. [illegible] fertilizers are used apply them at time of seeding. Nitrogenous and phosphatic manures are the best, especially the latter, as barley draws more heavily on nitrogen and phosphoric acid than on the potash and other ash constituents of the soil. Carrying out these conditions, with a favorable season, we may expect good results, but our work doesn't stop here. Harvesting is a critical point usually, more especially regarding the color, as barley is very susceptible to heavy dews or showers. Some one has said that there are only three days in which to cut barley: the day before it is ripe; the day it is ripe, and the day after it is ripe. I would advise to begin cutting the day before it is ripe, to get as much cut as possible on the day it is ripe, and finish the day after it is ripe. Ripe seeds malt quickest. There is often three and four days difference in the malting properties of barley, due for the most part to the different stages of maturity. Cutting with the self-binder has many advocates and many points in its favor. Unless it is entirely ripe, I think a better way is to swath it with a reaper, allow it time to cure, rake with a horse-rake into winrows, and if the weather be favorable house it, if not, cock it up. It is decidedly better to let barley sweat out in the mow than to thresh early and leave in large heaps. Barley, on the whole, I think is the easiest crop to handle on the farm, and can be grown with the least outlay. In fact it might be considered "the lazy man's crop."

The marketing of barley often gives the farmer more anxiety than all the trouble in growing it. Taking one year with another I believe the *early market* is the best, and by selling early it saves much uncalled for worry. But, says some one, we cannot afford to grow barley any more for 33c. to 43c. per bushel, and I must agree with the sentiment. Are there no means of making barley growing profitable, notwithstanding the keen competition of the Western States and our own great North-west? This competition doubtless has been *the* prominent factor, along with the over-production of the past year, in reducing the price. I will try to suggest a few ways out of our present difficulty.

As regards future prospects of Barley Growing in Ontario.

1. We must lower the cost of production and produce more per acre. This would mean less hired labor, the tilling less land and the enriching and cultivating better what land we do work.

2. Remove the restrictions at present existing on the export trade in barley. Where the price of an article is fixed in a foreign market, under a protective policy, the producer has to pay the duty when exporting his produce there, so that, the Ontario farmer marketing 500 bushels of barley with a duty of 10 cents per bushel on it, gets $50 less for his crop than he might have received had there been no tariff wall. I learn that during the years 1885-6, we exported from Ontario to the United States 20,178,877

bushels of barley, valued at $13,696,224. On this we paid as duty $2,017,887, o. $1,008,943 for one year. The argument is self-evident. Down with the tariff!

3. Why could we not become the source of supply for American seedsmen? Our conditions are favorable for growing first-class seed, and northern seeds are preferable for southern climates.

4. What is there to hinder us growing two-rowed barley for the English market? Could not the governments of the day be influenced to import a considerable quantity for experimental purposes and see if our conditions are not favorable for growing barley of the right stamp for the English market?

Barley has always ranked pretty high as a grain for feeding purposes. If we have to turn our attention more to stock raising and dairying than we have in the past, there is no reason why barley should not play an important part in the rations prepared for such purposes. It is a good grain for horses, especially when used with cut straw or hay, and it is an excellent feed for growing and fattening hogs. Having a nutritive ratio of 1: 8.2 it is better to feed it in conjunction with other fodders of a more albuminous character. It should be cracked, not floured, for feeding purposes; and here is where many farmers make a great mistake in having the coarse grains ground too finely. It is better to allow nature to do most of the work. Even the straw has considerable feeding merits, especially where bulk is required, and even the *beards*, when boiled and fed with the *tea*, make a nourishing article of diet for calves.

I will not discuss here the moral aspect of barley growing, as "a great deal might be said on both sides;" but will respectfully submit these few thoughts for your consideration, hoping I have suggested enough to form the basis of a lively discussion.

CLOSING EXERCISES.

After moving a vote of thanks to the retiring officers of the association, to the representatives of the "Press" present at the different sessions, and to the visitors, many of whom had taken an active part in the various discussions, the Eleventh Annual Meeting of the Ontario Agricultural and Experimental Union was brought to a close at 5 p.m.

BINDING SECT. AUG 2 3 1967